IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Art Unit: 3634 Examiner: CHIN SHUE, Alvin C.

In Re Application of: WOLLER, Ronald R., et al.	) Confirmation No. 4632
Serial No.: 10/777,613	)
Filed: February 12, 2004	) Appeal No. _____
For: **MODULAR HUNTING LADDER**	)

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APPEAL BRIEF UNDER 37 C.F.R. § 41.37

INTRODUCTION

This is an appeal to the Board of Patent Appeals and Interferences of the final rejection of all claims in the subject application. This Brief is in furtherance of Applicants' Notice of Appeal under 37 C.F.R. § 41.31, filed July 26, 2006, and the Final Office Action of May 26, 2006. This Brief is filed within three months of the date of the Notice of Appeal. Thus, a one-month extension of time is believed to be due. A petition for a one-month extension of time and the requisite fee is included herewith. However, if any additional extension is required, please consider this a request therefor. The requisite fee of $500 for this Brief is enclosed. The Commissioner is authorized to charge any additional fees or credit any overpayment to Deposit Account 50-1513.

1. REAL PARTY IN INTEREST

The real party in interest is the owner of the present application, Summit Treestands, LLC (the assignee of this application) of 715 Summit Drive, S.E., Decatur, Alabama 35601.

2. RELATED APPEALS AND INTERFERENCES

There are no other known appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this Appeal.

3. STATUS OF CLAIMS

Claims 1-3, 7-11, and 15 are pending in this application.

Claims 1-3, 7-11, and 15 stand finally rejected.

The appealed claims are claims 1-3, 7-11, and 15.

4. STATUS OF AMENDMENTS

No amendment after final was filed.

5. SUMMARY OF CLAIMED SUBJECT MATTER

The claimed invention of independent claim 1 relates generally to a hunting ladder 10 for attachment to a tree or pole, as shown in Fig. 1. The hunting ladder 10 has a plurality of ladder sections, such as ladder sections 12, 13, and 14, that can be assembled together to form a rigid structure, including side rails 15 and 16 and rungs 22 extending between the side rails. The side rails comprise elongate structural beams, wherein the

structural beams comprise double box I-beams having two box sections 17 and 18 and a web 19 extending therebetween (see page 5, paragraphs 0024 and 0025 of the present application). The hunting ladder 10 also includes external side bolsters 26 and 28 adapted to be mounted to the outside of adjacent ladder sections to couple the ladder sections together and fasteners 32 extendable through the side bolsters and the structural beams to allow the adjacent ladder sections to be coupled together and uncoupled, as desired. The external side bolsters 26 and 28 are shaped to match and closely abut the structural beams and are permanently or semi-permanently mounted to one ladder section and can be removably mounted to an adjacent ladder section. The external side bolsters 26 and 28 can be removably attached to each of the adjacent ladder sections. The side bolsters 26 and 28 closely overlay the contours of the double box I-beams, including the web 19 and the two box sections 17 and 18, and wrap around distal edges of the box sections. Thus, the structural beams and the external side bolsters 26 and 28 have shapes that mate together. The structural beams and the side bolsters 26 and 28 can mate together with a precision fit (as claimed in dependent claim 15) (see Figs. 3A, 3B, 4A, 5A, and 5B pages 6-7, paragraphs 29-30).

The hunting ladder 10 can further include a seat (as claimed in dependent claim 2) that is attached to an upper portion of the ladder, but is not attached to the tree or pole (see Figs. 1 and 2 and page 9, paragraph 40). The fasteners can include threaded hand knobs (as claimed in dependent claim 8) so that adjacent ladder sections can be coupled together without tools (as claimed in dependent claim 7) (see Figs. 3A and 3B and pages 7-8, paragraph 32).

The rungs of the hunting ladder can have a top surface that is oriented at an acute angle relative to the side rails (as claimed in dependent claim 10) (see Fig. 4C and page 6, paragraph 26). The side rails can comprise extruded aluminum and the rungs can comprise extruded aluminum, with ridges formed in a top portion of the rungs for minimizing foot slippage (as claimed in dependent claim 11) (see Figs. 3A and 3B and page 6 paragraphs 26-28).

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection to be reviewed on appeal are:

(1) Whether Claims 1-3, 7-9, and 15 are unpatentable under 35 U.S.C. §103(a) over Maxwell in view of Hutchinson and Crozier;

(2) Whether Claims 10 and 11 are unpatentable under 35 U.S.C. §103(a) over Maxwell, Hutchinson, Crozier, and Stillman, Jr.; and

(3) Whether Claim 2 is unpatentable over 35 U.S.C. §103(a) over Maxwell, Hutchinson, Crozier, and Robertson.

7. ARGUMENT

(1) Rejection of Claims 1-3, 7-9, and 15 Under 35 U.S.C. §103(a)

Claims 1-3, 7-9, and 15 stand rejected as being unpatentable over Maxwell in view of Hutchinson and Crozier. The Examiner has erroneously rejected the Applicants' claims.

The Examiner has not met his burden of establishing a *prima facie* case for obviousness. For a rejection to be proper under 35 U.S.C. §103(a), there must be some suggestion or motivation to combine the references, and the combination must teach every

element in the claim. Even in instances where prior art devices or references can be combined or modified to yield the claimed invention, and even though to modify the prior art would have been well within the ordinary skill of the art at the time the claimed invention was made, there must be some suggestion or motivation in the references, or some objective reason to do so. Further, the proposed modification cannot change the principle of operation of the reference. MPEP § 2143.01. Applicants submit the rejection is improper because neither of these requirements is met.

There is simply no disclosure, teaching, or suggestion in the references themselves or some objective reason to combine the metal ladder of Hutchinson with the portable tree stand of Maxwell, with the splice for structural shapes of Crozier, aside from Applicants' own disclosure. Since the prior art does not provide any suggestion or motivation for making the proposed combination, the combination of references relied on by the Examiner in the present case is nothing more than impermissible hindsight reconstruction based on Applicants' own teaching, which, of course, is legally impermissible.

Moreover, Applicants submit that Crozier is nonanalogous art. Crozier describes a splice for structural shapes, such as for bearing piles, which can expand or contract so as to bear tightly against the bearing piles. One skilled in the ladder art would not look to art related to load bearings to modify a ladder. Thus, the rejection is improper and should be withdrawn.

Claims 1, 3, 7, and 15

Claims 1, 3, 7, and 15 are not unpatentable over the improper combination of Maxwell, Hutchinson, and Crozier for at least the additional reason that the improper combination does not teach the claimed invention. Claim 1 recites,

> A hunting ladder for attachment to a tree or pole, comprising:
>
> a plurality of ladder sections that can be assembled together to form a rigid structure, including side rails and rungs extending between the side rails, the side rails comprising elongate structural beams, wherein the structural beams comprise double box I-beams having two box sections and a web extending therebetween;
>
> external side bolsters adapted to be mounted to the outside of adjacent ladder sections to couple the ladder sections together, the external side bolsters being shaped to match and closely abut the structural beams, wherein the external side bolsters are permanently or semi-permanently mounted to one ladder section and can be removably mounted to an adjacent ladder section, wherein the side bolsters closely overlay the contours of the double box I-beams, including the web and the two box sections and wrap around distal edges of the box sections, and wherein the structural beams and the external side bolsters have shapes that mate together; and
>
> fasteners extendable through the side bolsters and the structural beams to allow the adjacent ladder sections to be coupled together and uncoupled, as desired.

Claims 3, 7, and 15 depend directly from claim 1.

The improper combination does not teach at least the limitation of "external side bolsters adapted to be mounted to the outside of adjacent ladder sections to couple the ladder sections together, the external side bolsters being shaped to match and closely abut the structural beams, wherein the external side bolsters are permanently or semi-

permanently mounted to one ladder section and can be removably mounted to an adjacent ladder section, wherein the side bolsters closely overlay the contours of the double box I-beams." The Examiner relies on the disclosure of Crozier to attempt to show the external side bolsters. However, contrary to the Examiner's assertion that "Crozier teaches the claimed splice/bolster for the disclosed, claimed purpose for releasably splicing I-beam sections," (Final Office Action of May 26, 2006, page 4) Crozier simply does not disclose a releasable splice. The splice of Crozier is used for bearing piles that are driven into the ground. As disclosed in Crozier, a first bearing pile is driven into the ground, and then a splice is secured to the first bearing pile and to another bearing pile positioned in an end-to-end configuration with the first bearing pile. Then, the process of driving the piles into the ground is continued. Thus, the splices are intended to be permanent. Nothing in Crozier discloses, teaches, or suggests an external side bolster that can be removably mounted to an adjacent ladder section, as claimed in independent claim 1. Accordingly, allowance of claim 1, and by dependency, claims 3, 7, and 15, is respectfully requested.

Claim 2

Claim 2 is not unpatentable over the improper combination of Maxwell, Hutchinson, and Crozier for at least the additional reason that the improper combination does not teach the claimed invention. Claim 2 recites, "A hunting ladder as claimed in Claim 1 further comprising a seat attached to an upper portion of the ladder without requiring attachment of the seat to the tree or pole." Of Hutchinson, Crozier, and Maxwell, only Maxwell shows a seat. However, the seat of Maxwell is clearly attached to the tree, as shown in Figure 2 by the chain 45 that extends about the trunk of the tree. Accordingly, allowance of claim 2 is respectfully requested.

Claim 8

Claim 8 is not unpatentable over the improper combination of Maxwell, Hutchinson, and Crozier for at least the additional reason that the improper combination does not teach the claimed invention. Claim 8 recites, "A hunting ladder as claimed in Claim 7 wherein the fasteners comprise threaded hand knobs."

As admitted by the Examiner, the combination of Maxwell, Hutchinson, and Crozier does not teach threaded hand knobs. The Examiner states that "[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to provide conventional knob fasteners, in lieu of bolts as taught by Crozier, to facilitate hand assembly." (Final Office Action of May 26, 2006, pages 2-3). However, as described herein, nothing in Crozier discloses, teaches, or suggests an external side bolster that can be removably mounted to an adjacent ladder section as Crozier teaches splices for coupling bearing piles together. Thus, such splices are presumed to be permanent. It would not be obvious to substitute a removable treaded hand knob fastener (so as to couple and uncouple the sections without tools) for the bolts of Crozier. There is simply no need in Crozier to remove the splices from the bearing piles. Accordingly, allowance of claim 8 is respectfully requested.

Claim 9

Claim 9 is not unpatentable over the improper combination of Maxwell, Hutchinson, and Crozier for at least the additional reason that the improper combination does not teach the claimed invention. Claim 9 recites, "A hunting ladder as claimed in Claim 1 wherein the external side bolsters are removably attached to each of the adjacent ladder sections."

As discussed herein, nothing in Crozier discloses, teaches, or suggests an external side bolster that can be removably mounted to an adjacent ladder section as Crozier teaches splices for coupling bearing piles (which are driven into the ground) together. Accordingly, allowance of claim 9 is respectfully requested.

(2) Rejection of Claims 10 and 11 Under 35 U.S.C. §103(a)

Claims 10 and 11

Claims 10 and 11 are not unpatentable over the improper combination of Maxwell, Hutchinson, Crozier, and Stillman, Jr. The Examiner has erroneously rejected the Applicants' claims.

The Examiner has not met his burden of establishing a *prima facie* case for obviousness. For a rejection to be proper under 35 U.S.C. §103(a), there must be some suggestion or motivation to combine the references, and the combination must teach every element in the claim. Even in instances where prior art devices or references can be combined or modified to yield the claimed invention, and even though to modify the prior art would have been well within the ordinary skill of the art at the time the claimed invention was made, there must be some suggestion or motivation in the references, or some objective reason to do so. Further, the proposed modification cannot change the principle of operation of the reference. MPEP § 2143.01. Applicants submit the rejection is improper because there is no suggestion or motivation in the references.

There is simply no disclosure, teaching, or suggestion in the references themselves or some objective reason to combine the metal ladder of Hutchinson with the portable tree stand of Maxwell, with the splice for structural shapes of Crozier, with the angled rungs and

ridges of Stillman, Jr., aside from Applicants' own disclosure. Since the prior art does not provide any suggestion or motivation for making the proposed combination, the combination of references relied on by the Examiner in the present case is nothing more than impermissible hindsight reconstruction based on Applicants' own teaching, which, of course, is legally impermissible.

Additionally, because dependent claims 10 and 11 incorporate the limitations of claim 1, these dependent claims are allowable for at least the reasons set forth above for the corresponding independent claim. Thus, claims 10 and 11 are also allowable. Accordingly, allowance of claims 10 and 11 is respectfully requested.

(3) Rejection of Claim 2 Under 35 U.S.C. §103(a)

Claim 2

Claim 2 is not unpatentable over the improper combination of Maxwell, Hutchinson, and Crozier, and Robertson. Claim 2 recites, "A hunting ladder as claimed in Claim 1 further comprising a seat attached to an upper portion of the ladder without requiring attachment of the seat to the tree or pole."

The Examiner has not met his burden of establishing a *prima facie* case for obviousness. For a rejection to be proper under 35 U.S.C. §103(a), there must be some suggestion or motivation to combine the references, and the combination must teach every element in the claim. Even in instances where prior art devices or references can be combined or modified to yield the claimed invention, and even though to modify the prior art would have been well within the ordinary skill of the art at the time the claimed invention was made, there must be some suggestion or motivation in the references, or some

objective reason to do so. Further, the proposed modification cannot change the principle of operation of the reference. MPEP § 2143.01. Applicants submit the rejection is improper because there is no suggestion or motivation in the references.

There is simply no disclosure, teaching, or suggestion in the references themselves or some objective reason to combine the metal ladder of Hutchinson with the portable tree stand of Maxwell, with the splice for structural shapes of Crozier, with the seat of Robertson, aside from Applicants' own disclosure. Since the prior art does not provide any suggestion or motivation for making the proposed combination, the combination of references relied on by the Examiner in the present case is nothing more than impermissible hindsight reconstruction based on Applicants' own teaching, which, of course, is legally impermissible.

Moreover, Applicants submit that Crozier is nonanalogous art. Crozier describes a splice for structural shapes, such as for bearing piles, which can expand or contract so as to bear tightly against the bearing piles. One skilled in the ladder art would not look to art related to load bearings to modify a ladder. Thus, the rejection is improper and should be withdrawn.

Additionally, because dependent claim 2 includes incorporates the limitations of claim 1, this dependent claim is allowable for at least the reasons set forth above for the corresponding independent claim. Thus, claim 2 is also allowable. Accordingly, allowance of claim 2 is respectfully requested.

CONCLUSION

In view of the above and the attached appendices, the pending grounds of rejection cannot be maintained and all pending claims must be allowed. Any communication that may expedite allowance should be directed to Applicants' undersigned attorney at (770) 984-2300.

Respectfully submitted,
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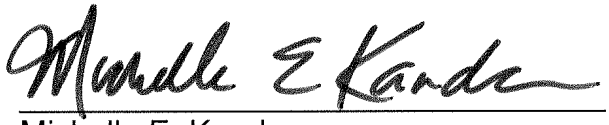

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8. CLAIMS APPENDIX

1. A hunting ladder for attachment to a tree or pole, comprising:

a plurality of ladder sections that can be assembled together to form a rigid structure, including side rails and rungs extending between the side rails, the side rails comprising elongate structural beams, wherein the structural beams comprise double box I-beams having two box sections and a web extending therebetween;

external side bolsters adapted to be mounted to the outside of adjacent ladder sections to couple the ladder sections together, the external side bolsters being shaped to match and closely abut the structural beams, wherein the external side bolsters are permanently or semi-permanently mounted to one ladder section and can be removably mounted to an adjacent ladder section, wherein the side bolsters closely overlay the contours of the double box I-beams, including the web and the two box sections and wrap around distal edges of the box sections, and wherein the structural beams and the external side bolsters have shapes that mate together; and

fasteners extendable through the side bolsters and the structural beams to allow the adjacent ladder sections to be coupled together and uncoupled, as desired.

2. A hunting ladder as claimed in Claim 1 further comprising a seat attached to an upper portion of the ladder without requiring attachment of the seat to the tree or pole.

3. A hunting ladder as claimed in Claim 1 wherein the plurality of ladder sections comprises three ladder sections.

7. A hunting ladder as claimed in Claim 1 wherein the adjacent ladder sections can be coupled together without tools.

8. A hunting ladder as claimed in Claim 7 wherein the fasteners comprise threaded hand knobs.

9. A hunting ladder as claimed in Claim 1 wherein the external side bolsters are removably attached to each of the adjacent ladder sections.

10. A hunting ladder as claimed in Claim 1 wherein the rungs have a top surface which is oriented at an acute angle relative to the side rails.

11. A hunting ladder as claimed in Claim 1 wherein the side rails comprise extruded aluminum and the rungs comprise extruded aluminum, with ridges formed in a top portion of the rungs for minimizing foot slippage.

15. A hunting ladder as claimed in Claim 1 wherein the structural beams and the side bolsters mate together with a precision fit.

9. EVIDENCE APPENDIX

No evidence pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132 was entered by the Examiner and relied upon the Appellant in the appeal.

Other evidence entered by the Examiner and relied on by the Appellant in this appeal includes:

(1) U.S. Patent Number 3,703,939 of Maxwell, as entered by Examiner in the Office Action of March 7, 2005;

(2) U.S. Patent No. 2,552,630 of Hutchinson, as entered by Examiner in the Office Action of March 7, 2005;

(3) U.S. Patent No. 2,296,336 of Crozier, as entered by Examiner in the Office Action of March 7, 2005;

(4) U.S. Patent No. 4,261,436 of Stillman, Jr., as entered by Examiner in the Office Action of March 7, 2005; and

(5) U.S. Patent No. 5,275,257 of Robertson, as entered by Examiner in the Office Action of October 5, 2005.

A copy of each reference is attached hereto.

United States Patent

Maxwell

[15] **3,703,939**

[45] **Nov. 28, 1972**

[54] **PORTABLE TREE STAND**

[72] Inventor: **Edward Ralph Maxwell,** 607 W. Pope Street, Dunn, N.C. 28334

[22] Filed: **Jan. 15, 1971**

[21] Appl. No.: **106,747**

[52] **U.S. Cl.** **182/107,** 182/116, 182/178, 182/214

[51] **Int. Cl.**.....**E06c 1/10**

[58] **Field of Search**.....182/116, 93, 214, 187, 178, 182/107

[56] **References Cited**

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Primary Examiner—Reinaldo P. Machado
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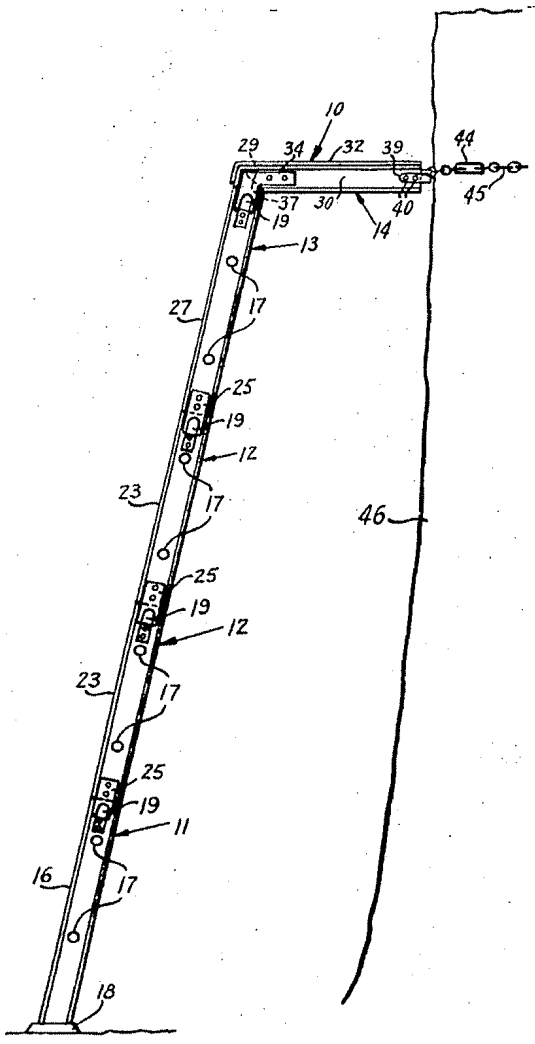
[57] **ABSTRACT**

A portable tree stand for hunters use formed of a plurality of sections detachably secured together to support a seat section extending horizontally from the top of the erected sections to engage a tree. A chain and turnbuckle system encompasses the tree and draws a spike carrying bar into engagement with the tree with the spikes embedded in the tree.

4 Claims, 8 Drawing Figures



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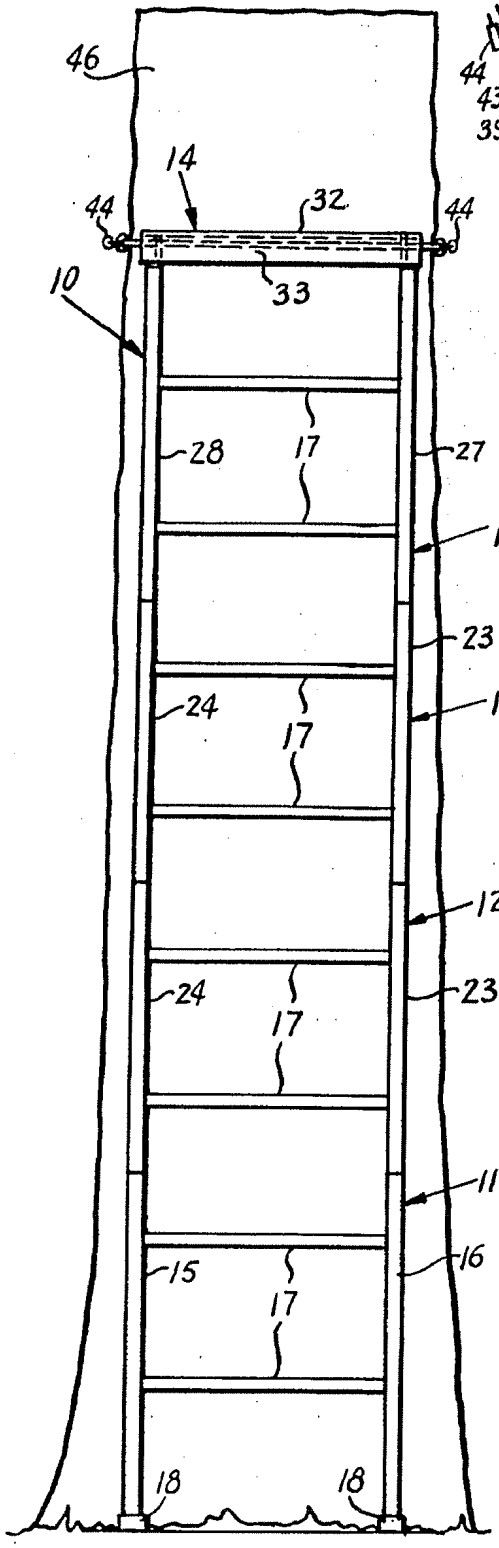

FIG. 1

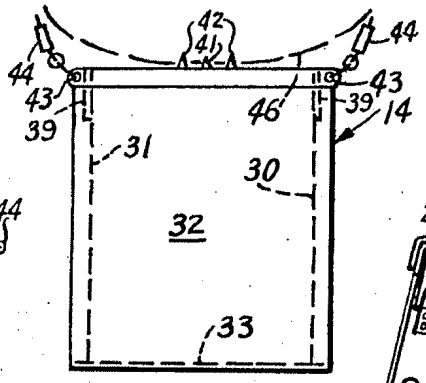

FIG. 3

FIG. 2

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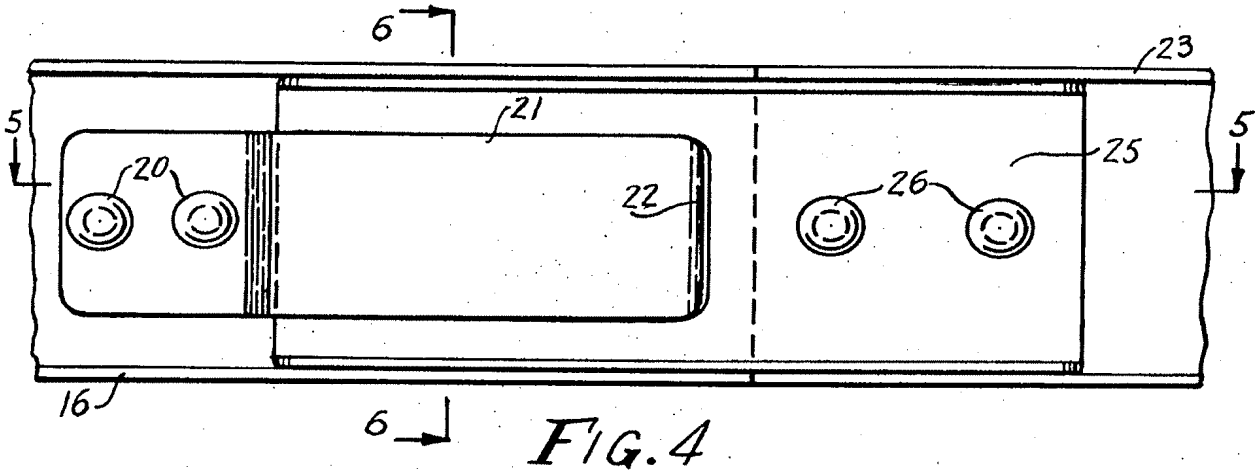

FIG. 4

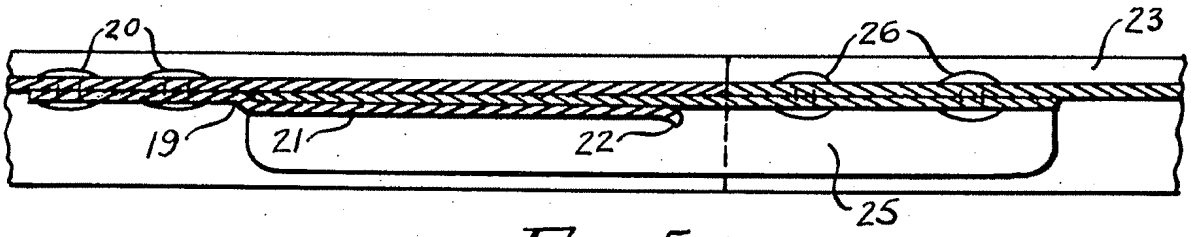

FIG. 5

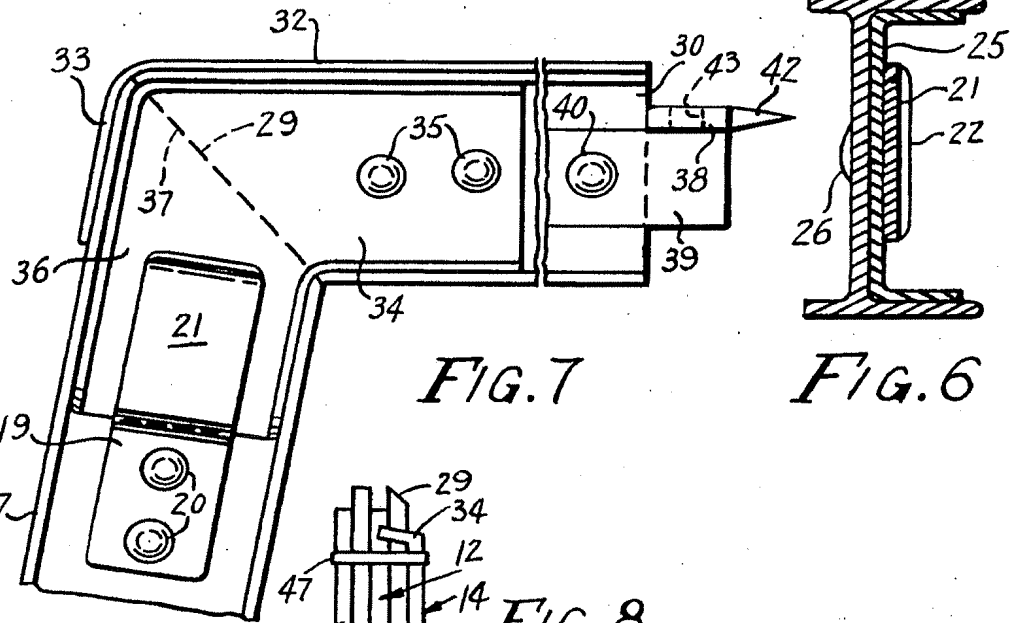

FIG. 7

FIG. 6

FIG. 8

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PORTABLE TREE STAND

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to portable stands for attachment to a tree for a hunters use to observe game.

Summary of the Invention

The tree stand includes a plurality of ladder forming sections which can be readily assembled in end to end relation and having a seat detachably secured to the upper end. A spike carrying bar is rigidly secured to the seat frame and a turnbuckle tightened chain is secured to opposite ends of the bar and encompasses a tree in order to draw the spikes of the spike bar into the tree.

The primary object of the invention is to provide a light weight portable tree stand which can be readily erected and secured to a tree to form a safe stand for a hunter.

Other objects and advantages will become apparent in the following specification when considered in the light of the attached drawings.

Brief Description of the Drawings

FIG. 1 is a front elevation of the invention shown attached to a tree;

FIG. 2 is a side elevation of the structure illustrated in FIG. 1;

FIG. 3 is a top plan view of the stand;

FIG. 4 is an enlarged fragmentary side elevation of one of the joints;

FIG. 5 is a longitudinal sectional view taken along the line 5—5 of FIG. 4 looking in the direction of the arrows;

FIG. 6 is a transverse sectional view taken along the line 6—6 of FIG. 4 looking in the direction of the arrows;

FIG. 7 is an enlarged fragmentary side elevational view of the joint between the upper ladder section and the seat section shown partially broken away and in section for convenience of illustration; and

FIG. 8 is an elevational view of the disassembled stand bundled for carrying.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in detail wherein like reference characters indicate like parts throughout the several figures the reference numeral **10** indicates generally a portable tree stand constructed in accordance with the invention.

The portable tree stand **10** includes a base ladder section indicated generally at **11**, a pair of intermediate ladder sections indicated generally at **12**, an upper ladder section indicated generally at **13** and a seat section indicated generally at **14**.

The base ladder section **11** includes a pair of extruded side rails **15, 16** connected by a pair of rungs **17**. The side rails **15, 16** are provided with feet **18** for engagement with the ground. A spring clip **19** is secured by a pair of rivets **20** to the upper end portions of the rails **15, 16** for reasons to be assigned. The spring clip **19** has an offset portion **21** which is spaced outwardly from the rail **16** and parallel thereto. The offset portion **21** is flared at **22** on its outer end for reasons to be assigned.

THe intermediate ladder sections **12** include a pair of extruded aluminum side rails **23, 24** connected by a pair of rungs **17**. A channel member **25** is secured to the lower end of the rails **23, 24** by a pair of rivets **26**. The channel member **25** projects below the end of the rails **23, 24** and is adapted to engage in the rail **16** under the offset portion **21** of the spring clip **19**. The upper end of the intermediate ladder section **12** is provided with spring clips **19** cooperating with channel members **25** of the section **12** thereabove.

The upper ladder section **13** includes a pair of upright parallel side rails **27, 28** connected by a pair of horizontal rungs **17**. The upper ends of the side rails **27, 28** are beveled at **29** for reasons to be assigned. The lower ends of the side rails **27, 28** are equipped with channel members **25** for cooperation with the spring clip **19** of the upper end of the intermediate section **12**. The upper end of the rails **27, 28** are each provided with spring clips **19** for reasons to be assigned.

The seat section **14** includes a pair of extruded aluminum horizontal side rails **30, 31** connected by a flat seat panel **32**. The seat panel **32** has a downwardly projecting flange **33** integrally formed on the forward edge thereof to assist in strengthening the set section **14**. A channel member **34** is secured to each of the side rails **30, 31** by a pair of rivets **35**. The channel member **34** has an angularly depending leg **36** which is adapted to engage in the upper ends of the side rails **27, 28** to cooperate with the spring clips **19** to secure the seat section **14** to the upper ladder section **13**. The side rails **30, 31** have their outer ends beveled at **37** to cooperate with the beveled end **29** of the side rails **27, 28** as is clearly shown in FIG. **7**. An elongate generally rectangular horizontal bar **38** extends transversely of the seat section **14** and has a pair of short mounting members **39** welded thereto and extending horizontally therefrom. The mounting members **39** are secured to the side rails **30, 31** by rivets **40** which extend therethrough. The bar **38** has an integral tooth **41** formed centrally thereon and projecting outwardly from the seat section **14**. A pair of teeth **42** are integrally formed on the bar **38** on opposite sides of the tooth **41** and have a length greater then the length of the tooth **41**.

The bar **38** extends beyond the rails **30, 31** at each end thereof and is provided with a bore **43** at each end thereof to receive a turnbuckle **44** connected thereto. A chain **45** is detachably connected to the turnbuckles **44** and is adapted to extend about the trunk of a tree **46**.

In FIG. **8** a bundle of the portable stand sections is illustrated connected together by removeable straps **47**.

In the use and operation of the invention the hunter carries the bundle illustrated in FIG. **8** into the woods until he finds a suitable tree **46** for the erection of the portable tree stand **10**. The straps **47** are removed and one intermediate section **12** is assembled with the base section **11** and a second intermediate section **12** is assembled on top of the first intermediate section **12**. The upper ladder section **13** is then assembled with the uppermost intermediate section **12** and finally the seat section **14** is assembled onto the upper end of the upper ladder section **13**. The assembled stand is then engaged against a tree **46** and the hunter passes the chain **45** around the tree **46** connecting it to the turnbuckles **44**

at each end. The turnbuckles **44** are then tightened drawing the teeth **41**, **42** into the wood of the tree locking the seat section **14** thereto.

While the invention has been disclosed and described using extruded aluminum side rails it should be understood that the side rails may also be formed of tubular aluminum material when desired.

Having thus described the preferred embodiment of the invention it should be understood that numerous structural modifications and adaptations may be resorted to without departing from the spirit of the invention.

What is claimed is:

1. A portable tree stand comprising a base ladder section including a pair of side rails having longitudinally extending channels, an intermediate ladder section including a pair of side rails having longitudinally extending channels, an upper ladder section including a pair of side rails having longitudinally extending channels, means for detachably securing the intermediate section to said base section and said upper section with said sections in aligned relation including a channel member secured in the channel side rail of one of said sections and projecting longitudinally to detachably engage in the channel side rail of another of said sections and a spring retainer on the other of said sections for engaging said channel member, a seat section including a channel side rail and a channel member secured in said channel side rail of said seat section and projecting longitudinally to detachably engage in the channel side rail of said upper section, and a spring retainer on said upper section for engaging said channel member, a horizontal bar rigidly secured to said seat section, a plurality of teeth integrally formed on said bar and projecting outwardly therefrom oppositely of said seat, a pair of turnbuckles secured to opposite ends of said bar, and a tree encompassing chain detachably secured to opposite ends of said turnbuckle for securing said spikes to said tree with said spikes embedded therein.

2. A device as claimed in claim **6** wherein the means for securing said ladder sections together includes a projecting channel member on the terminal end of one of said members and a cooperating spring clip on the terminal end of the other of said members.

3. A device as claimed in claim **1** wherein each of said ladder sections include a pair of extruded aluminum side rails rigidly connected by a pair of spaced apart horizontally extending rungs.

4. A device as claimed in claim **1** wherein said bar is rigidly connected to said side rails.

* * * * *

May 15, 1951 H. M. HUTCHINSON 2,552,630

METAL LADDER

Filed Aug. 6, 1947 3 Sheets-Sheet 1

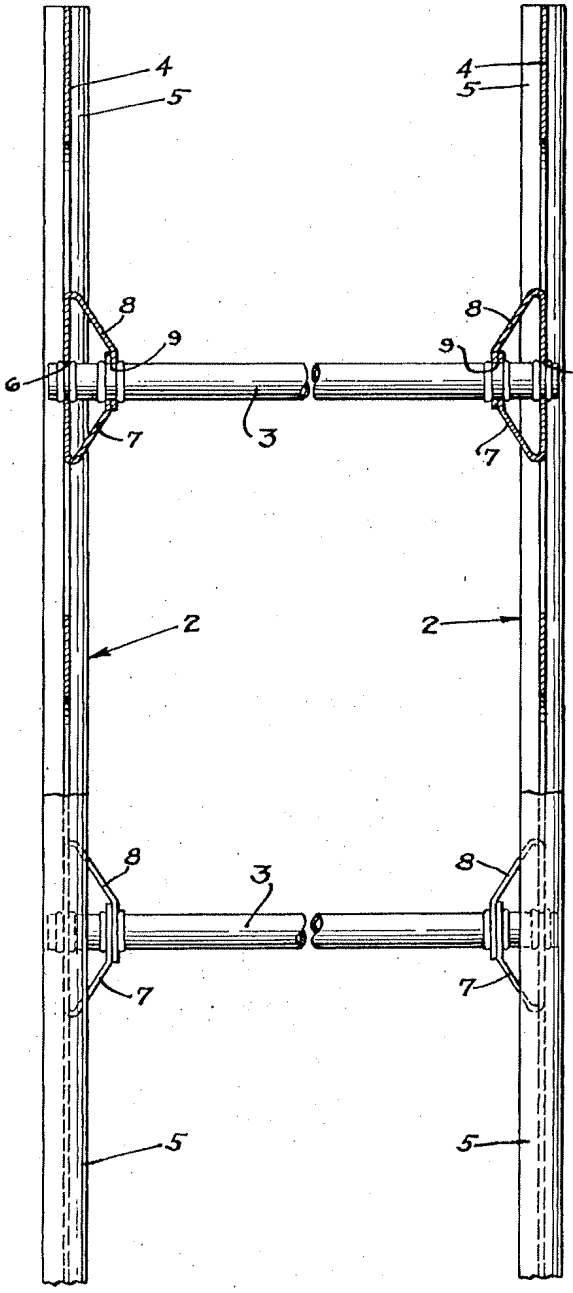

FIG. 1

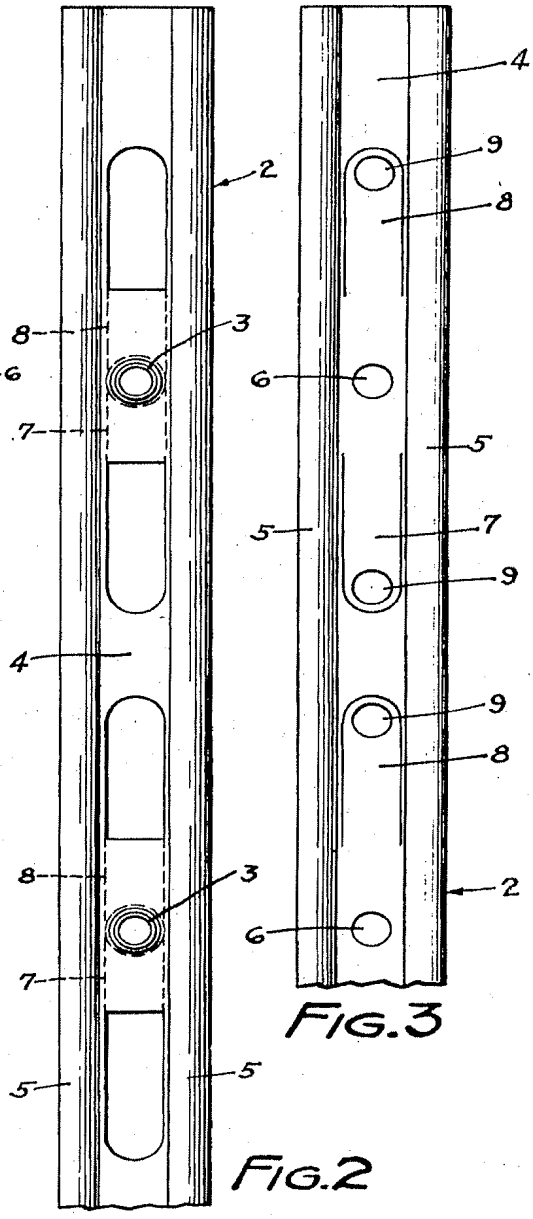

FIG. 2

FIG. 3

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METAL LADDER

Filed Aug. 6, 1947 3 Sheets-Sheet 2

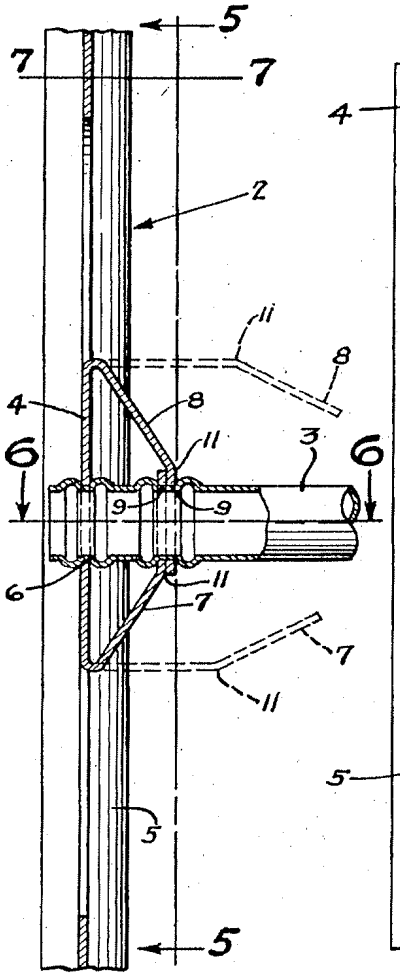

FIG. 4

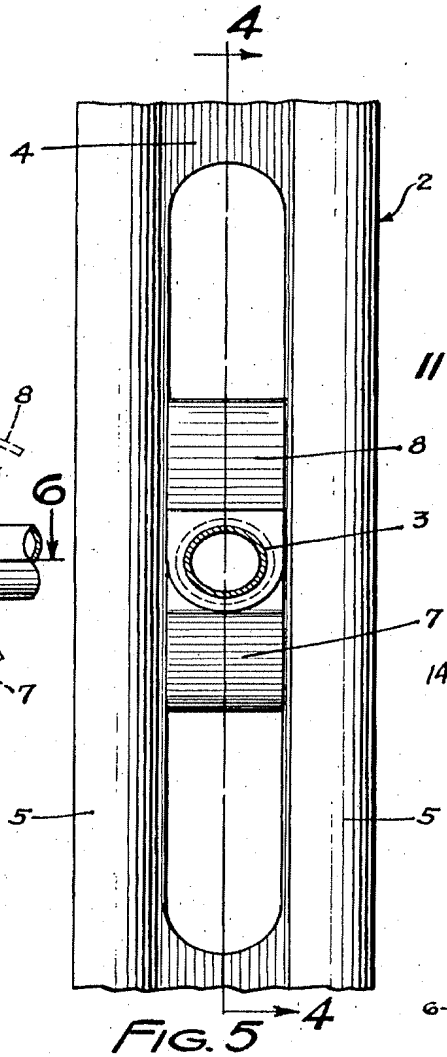

FIG. 5

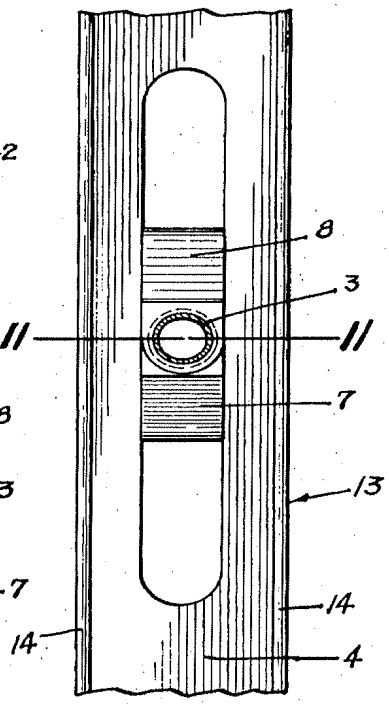

FIG. 10

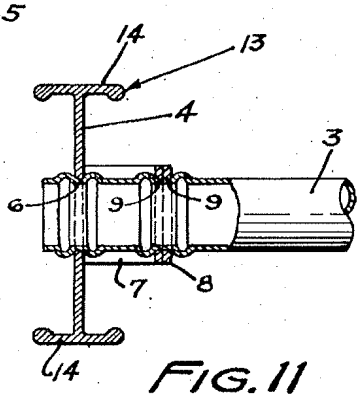

FIG. 11

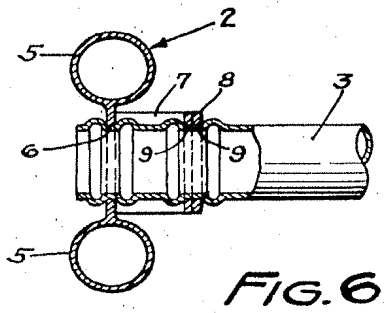

FIG. 6

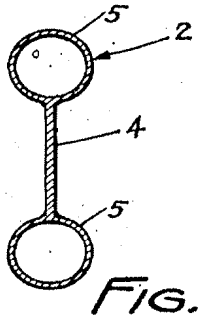

FIG. 7

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METAL LADDER

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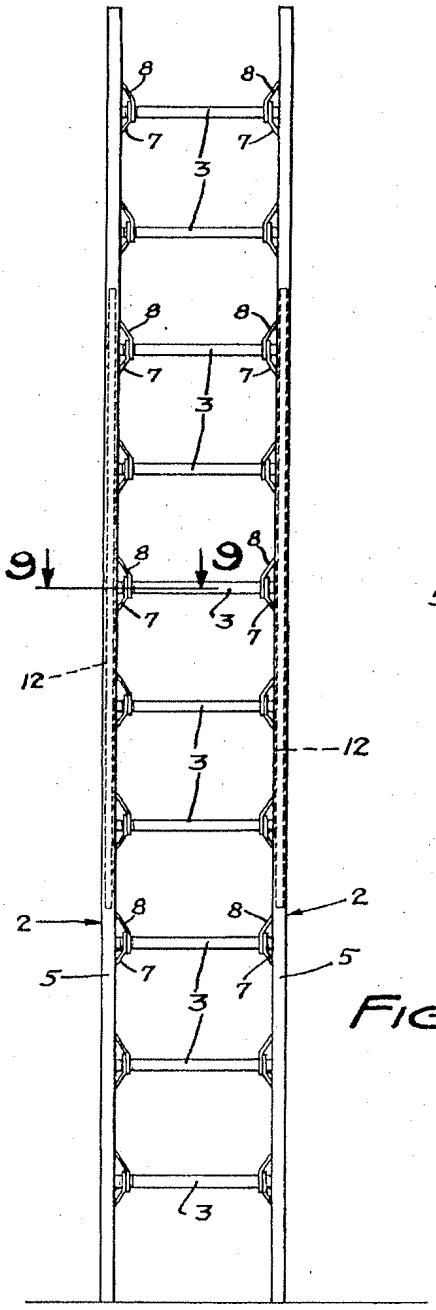

FIG. 8

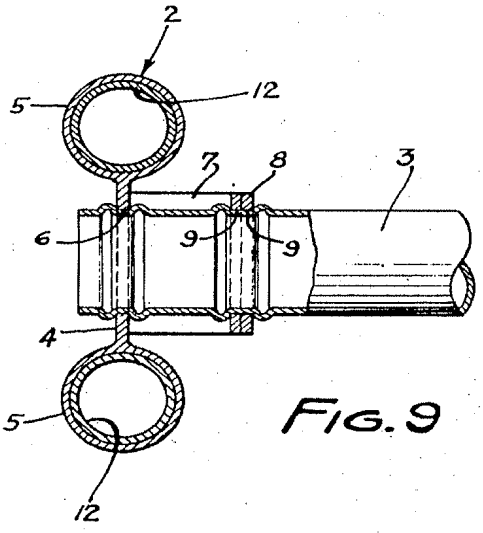

FIG. 9

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Patented May 15, 1951

2,552,630

UNITED STATES PATENT OFFICE

2,552,630

METAL LADDER

Henry M. Hutchinson, Minneapolis, Minn.

Application August 6, 1947, Serial No. 766,576

6 Claims. (Cl. 228—56)

1

This invention relates to new and useful improvements in ladders and more particularly to ladders constructed of a suitable lightweight metal such as aluminum.

During the past few years, aluminum has become very popular in the manufacturing industry, primarily because of the improvements made in the production of the metal, and also because of the improvements made in the metal itself, it now being possible to obtain aluminum alloys of almost any desired hardness without sacrificing lightness, whereby the use of aluminum in the industrial field has become very popular and widespread, in that it may be used in the manufacture of a great many articles with most desirable and practical results, ladders being one such use.

It has also been found, in the manufacture and production of aluminum, that such metal may readily be formed into long bars of almost any desired cross section by the usual rolling and drawing method, and, in addition, it readily lends itself to the extrusion method of forming longitudinal rails or bars, whereby portions of such rails or bars may be made tubular or otherwise shaped cross sectionally, in a very expeditious manner.

The present invention is directed more particularly to the provision of an all metal ladder constructed of a lightweight metal such as aluminum, and wherein the usual rungs of the ladder have their end portions suitably interlocked with the side rails of the ladder to provide, in effect, an integral structure having great strength and durability, and which is extremely light in weight, whereby it may readily be transported from one place to another with a minimum of effort, a highly desirable attribute in a device of this general character.

A further object of the invention is to provide a ladder having spaced side rails, each comprising a longitudinally extending web, which are suitably reinforced along their opposed edges to strengthen the rails against lateral deflection, when subjected to a load, and said webs having longitudinally spaced apertures therein adapted to receive the ends of tubular rungs, portions of the walls of said rungs at each side of the rail webs being formed with outwardly projecting annular beads, whereby the rung ends are so interlocked with the side rails as to provide, in effect, an integral ladder structure having great strength, and which is extremely light in weight.

A further and more specific object is to provide an aluminum ladder including spaced side rails,

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each comprising a longitudinally extending web having its opposed edges formed with suitable enlargements to reinforce said rails against lateral deflection, when the ladder is subjected to a load, and a plurality of longitudinally spaced apertures being provided in the web of each side rail, and suitable tongues being struck from said webs at each side of each aperture, and the tongues adjacent to each aperture being bent inwardly and having their end portions disposed in overlapping relation, and suitable apertures being provided in said overlapping tongue portions which apertures are axially aligned with their respective apertures in said webs, and a plurality of tubular rungs having their end portions inserted through the aligned apertures in said overlapped tongues and in the adjacent apertures in the rail webs, after which the walls of said rungs are formed with outwardly projecting annular beads at the sides of said tongue portions, and adjacent to the webs, and whereby the ends of the rungs may be firmly secured to the ladder side rails to form, in effect, an integral structure.

A further object of the invention resides in the novel way in which the ends of the rungs are secured to the side rails whereby the ladder, when completed, is greatly reinforced against lateral swaying, the cross-sectional shape of the side rails being such as to provide the utmost in strength and resistance to lateral deflection, when the ladder is subjected to a load, and whereby the invention is particularly applicable to extension ladders, and the like, which require great strength and durability.

Other objects of the invention reside in the novel construction of the overlapping tongues which, because of their inherent construction, cooperate with the web of each side rail to provide elongated bearings for the ends of the rungs, whereby when the rungs are secured to the side rails, as herein disclosed, the ends of the rungs become firmly united with the side rails thereby to eliminate play in the joints, a highly desirable attribute in a structure of this general type, particularly in the construction of relatively long extension ladder sections.

Other objects of the invention will appear from the following description and the accompanying drawings and will be pointed out in the annexed claims.

In the accompanying drawings there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to

the exact features shown, as various changes may be made within the scope of the claims which follow.

In the drawings:

Figure 1 is a view showing a section of a ladder and illustrating the preferred manner of securing the rungs to the ladder side rails;

Figure 2 is a side view of a portion of a ladder showing the tongues struck from the web to provide means for anchoring the ends of the rungs to the side rails;

Figure 3 is a side view of a portion of a side rail showing the rung receiving holes formed therein and also the punching of the tongues prior to bending them into the form shown in Figure 1;

Figure 4 is an enlarged longitudinal sectional view on the line 4—4 of Figure 5;

Figure 5 is a vertical sectional view on the line 5—5 of Figure 4;

Figure 6 is a detail sectional view on the line 6—6 of Figure 4;

Figure 7 is a cross sectional view on the line 7—7 of Figure 4;

Figure 8 is a view showing a completed ladder having its side rails provided with suitable reinforcing inserts;

Figure 9 is an enlarged detail sectional view on the line 9—9 of Figure 8, showing the tubular reinforcing elements inserted into the longitudinally extending tubular portions of the side rails;

Figure 10 is a view showing a side rail of slightly modified construction wherein the opposed edges of each side rail are T-shaped in cross-section; and

Figure 11 is a detail sectional view on the line 11—11 of Figure 10.

The novel ladder herein disclosed is shown comprising a pair of side rails, generally designated by the numeral 2, secured together in spaced relation by suitable rungs 3, preferably tubular in cross section, as illustrated in the drawings. Each side rail 2 is shown comprising a longitudinally extending web 4 provided at its opposed edges with suitable reinforcing portions, preferably in the form of tubular, substantially cylindrical elements 5, which serve to adequately strengthen the webs against lateral and edgewise deflection, when the ladder is subjected to a load.

Because of the advancement made in the production of aluminum bars in the past few years, it is now possible to obtain aluminum bars of considerable length formed with integral tubular side reinforcing members 5, as shown in Figure 7. Rails of such cross section readily lend themselves for use in the construction of ladders, particularly extension ladders, because of being extremely light in weight in proportion to their strength. The particular cross section shown in Figure 7 also provides a very convenient grip whereby an individual may readily grasp the side rails of the ladder with a firm grip and without danger of his hands slipping therefrom when moving the ladder about from one place to another.

One of the important features of the present invention resides in the novel manner employed for securing the rungs 3 to the side rails 2 of the ladder, whereby looseness in the connections between the rungs and the side rails is completely and positively eliminated so that the rungs and side rails become, in effect, an integral structure

which will provide the utmost in strength and stability in proportion to its size and weight.

To thus secure the ends of the rungs to the side rails, the web 4 of each side rail is formed with a plurality of apertures 6 which are spaced apart lengthwise of the rails corresponding to the spacing between the rungs, as shown in Figures 1 and 8. Suitable tongues 7 and 8 are struck from the web 4, below and above, respectively, of each aperture 6, and each tongue is formed with a suitable aperture 9, as clearly illustrated in Figure 3. The diameters of the apertures 6 and 9 correspond substantially to the outside diameter of the rungs 3.

After the tongues have been struck or sheared from the web 4, as indicated in Figure 3, each pair of tongues 7 and 8 are bent laterally from the web to the dotted line positions shown in Figure 4, and simultaneously have their outer apertured end portions bent as indicated at 11 in Figure 4. Each pair of tongues are then further inwardly bent towards one another until their end portions are disposed in overlapping relation, and in such manner that the apertures 9 therein are axially aligned with one another and also with the adjacent aperture 6 provided in the web 4.

When the tongues of each pair of tongues of the two rails have thus been bent into overlapping relation, the clyindrical end portions of the rungs 3 are inserted through the aligned apertures in each pair of tongues and their respective webs 4. The walls of the rungs are then outwardly beaded, as best illustrated in Figure 4, at opposite sides of the tongues and also at opposite sides of the web 4, whereby the rungs become firmly secured to the side rails in a manner to eliminate any possibility of play between the parts, and also whereby the connections between the ends of the rungs and the side rails will form, in effect, substantially an integral structure.

Because of the lateral spacing of the overlapped ends of the tongues 7 and 8 and their respective rail webs 4, and further because of the outward beading of the walls of the rungs, as hereinbefore described, the connections between the rungs and the rails are of sufficient length to provide a very rugged and substantial structure which is highly resistant to side sway, when subjected to a load, as will readily be understood. At the same time, the tubular edge portions 5 of the side rails 2 minimize deflection of the side rails in the median planes thereof, thereby resulting in the production of a ladder section which presents the utmost in strength and ruggedness in proportion to its weight, which are highly desirable features in a structure of this general type.

Another feature of the invention resides in the production of a lightweight ladder so constructed that its side rails may be readily and conveniently reinforced against excessive deflection at any portion of the length of the ladder, which is particularly desirable in extension ladder sections which, at times, may be quite long.

To thus reinforce the side rails of the ladder, tubular inserts, generally designated by the numeral 12, may be inserted into the tubular side portions 5 of the rails 2, as shown in full lines in Figure 9 and dotted lines in Figure 8. These inserts may be of any desired length depending upon the length of the ladder section, and may be located at any particular location lengthwise of the side rails. In Figure 8 it will be noted that they are located at the intermediate portion of

the ladder which is usually subjected to the maximum deflection, when the ladder is under a load.

If desired, the reinforcing elements 12 may be removably supported within both tubular portions 5 of each side rail, or but one such reinforcing element may be employed in each side rail, depending upon the load to be carried by the ladder. If the ladder is found to have adequate strength without additional reinforcement, the inserts 12 may be dispensed with.

Figures 10 and 11 show a side rail, generally designated by the numeral 13, whose side edges are T-shaped in cross section, as indicated at 14 in Figure 11. The method of securing the rungs 3 of the webs 4 of the side rails 13, is identically the same as shown and described with reference to the previous figures, and the parts thereof will therefore be identified by like numerals.

I have herein referred to the ladder as constructed of aluminum, but it is to be understood that it may be constructed of any other lightweight metals or metal alloys suitable for the purpose, aluminum having been found as a very practical metal for such use. The novel ladder herein disclosed provides the utmost in strength in that the particular manner of securing the ends of the rungs to the side rails so connects together the rungs and side rails that it is practically impossible for any play or looseness to develop in the connections therebetween. In Figure 4 it will be noted that the walls of the rungs have been outwardly annularly beaded at opposite sides of the overlapping tongue ends, and also at opposite sides of the rail webs 4. In some instances, it may be possible to eliminate some of the beading, but when beaded as herein disclosed, the rungs are positively locked against relative movement in the side rails. It will also be noted that the rungs are secured to the side rails without separate securing elements or welding, the beading shown and described constituting a very practical operation which may readily be performed with suitable tools, well known in the art.

It will be apparent to those skilled in the art that I have accomplished at least the principal objects of my invention, and it will also be apparent to those skilled in the art that the embodiments herein described may be variously changed and modified without departing from the spirit of the invention, and that the invention is capable of uses and has advantages not herein specifically described; hence it will be appreciated that the herein disclosed embodiments are illustrative only, and that my invention is not limited thereto.

I claim as my invention:

1. In a ladder, spaced side rails each comprising a longitudinally extending web, the opposed edges of said webs being formed with integral enlargements extending outwardly from the median plane of each web to reinforce said rails against lateral deflection, a plurality of apertures in each rail web spaced apart longitudinally of the rails, rung securing members struck from said webs adjacent to the apertures provided in each rail web, and a plurality of rungs interposed between said rails and having their end portions received in said apertures and engaged with said struck out rung securing members, thereby to secure the rungs to the rails in fixed spaced relation.

2. In an all-metal ladder, spaced side rails each comprising a longitudinally extending web, the opposed edges of said webs being formed with integral enlargements of tubular cross-section extending outwardly from the median plane of each web to reinforce said rails against lateral deflection, when said rails are subjected to a load, spaced apertures in said webs, a plurality of rungs each having their opposed ends received in corresponding apertures in said webs, laterally projecting means on said rungs adjacent the ends thereof for engaging opposite sides of each side rail web to prevent relative axial movement of the rungs in the side rails, and tongue-like members struck from the rail webs and extending inwardly and engaging said rungs at points spaced inwardly from said webs and cooperating with said beaded rung portions to secure the rungs to the rail webs.

3. In an all-metal ladder, spaced side rails, each side rail comprising a longitudinally extending web, the opposed edges of said webs being formed with suitable reinforcing elements to resist lateral strains imposed on said rails, a plurality of tubular rungs, rung-receiving apertures in the webs of said side rails, an elongated tongue struck from the web of each side rail adjacent to each rung-receiving aperture, said tongues being bent laterally from their respective rail webs and having their end portions disposed in substantially parallel relation thereto, and each tongue having a rung-receiving aperture axially aligned with an aperture in the rail web, the aligned apertures in the rail webs and their respective tongues receiving the end portions of said rungs, and means for fixedly securing the end portions of the rungs in said apertures to complete the formation of the ladder.

4. In an all-metal ladder, spaced side rails, each side rail comprising a longitudinally extending web, the opposed edges of said webs being formed with suitable reinforcing elements to resist lateral strains imposed on said rails, a plurality of tubular rungs, rung-receiving apertures in the webs of said side rails, a pair of elongated tongues struck from the web of each side rail adjacent to each rung-receiving aperture, and the end portions of each pair of tongues being bent laterally from their respective rail webs and having their end portions disposed in overlapping relation, rung-receiving apertures in said overlapped tongue portions axially aligned with their complemental apertures in the rail webs, the aligned apertures in the rail webs and their respective tongues receiving the end portions of said rungs, and means for fixedly securing the end portions of the rungs in said apertures to complete the formation of the ladder.

5. In an all-metal ladder, spaced upright side rails, each side rail comprising spaced parallel tubular portions secured together by an integral web, a plurality of apertures formed in the web of each side rail and spaced apart lengthwise thereof, longitudinally disposed tongues struck from said webs and arranged in pairs, one tongue at each side of each of said apertures, the end portions of each pair of said tongues being bent inwardly and towards one another and disposed in overlapping relation, the overlapped ends of each pair of said tongues having apertures therein axially aligned with their complemental web apertures, and a plurality of rungs having cylindrical end portions fitted into and secured in the aligned apertures in each pair of complemental tongues and the adjacent web portions, thereby to complete the formation of the ladder.

6. In an all-metal ladder, spaced upright side rails, each side rail comprising spaced parallel

tubular portions secured together by an integral web, a plurality of apertures formed in the web of each side rail and spaced apart lengthwise thereof, longitudinally disposed tongues struck from said webs, one at each side of each of said apertures, the end portions of said tongue being bent inwardly and towards one another with their ends disposed in overlapping relation, said overlapped tongue portions having apertures therein axially aligned with the adjacent apertures in the webs of the side rails, a plurality of rungs having cylindrical end portions received in the aligned apertures in each pair of complemental tongues, and the adjacent web portions, and the end portions of said rungs being formed with annular outwardly directed beads at the opposed sides of the side rail webs and said overlapped tongue ends thereby to firmly interlock the ends of the rungs with the rail webs and said tongues to provide a very rugged ladder section.

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Sept. 22, 1942. E. G. CROZIER 2,296,336

SPLICE FOR STRUCTURAL SHAPES

Filed July 18, 1939

FIG. 1.

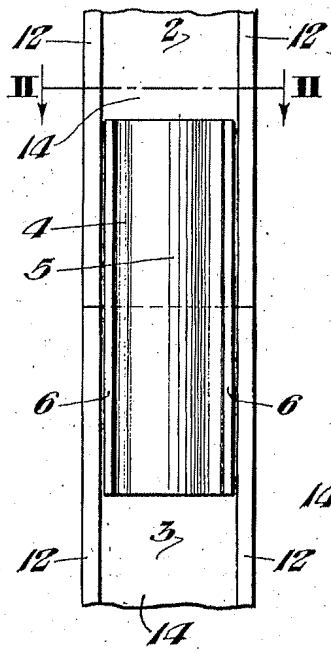


FIG. 2.

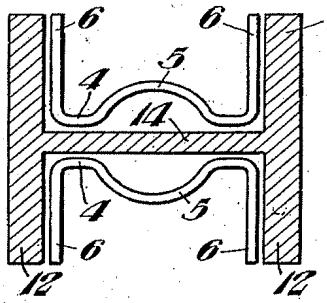


FIG. 3.

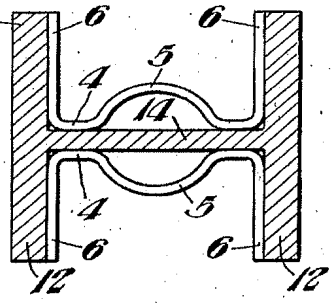


FIG. 4.

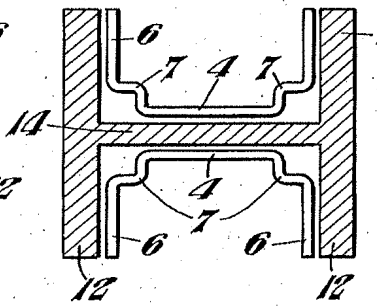


FIG. 5.

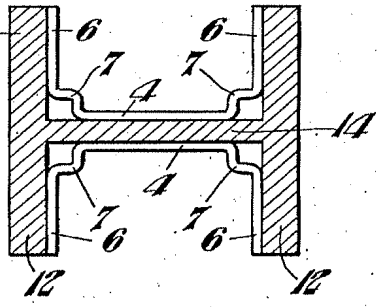


FIG. 6.

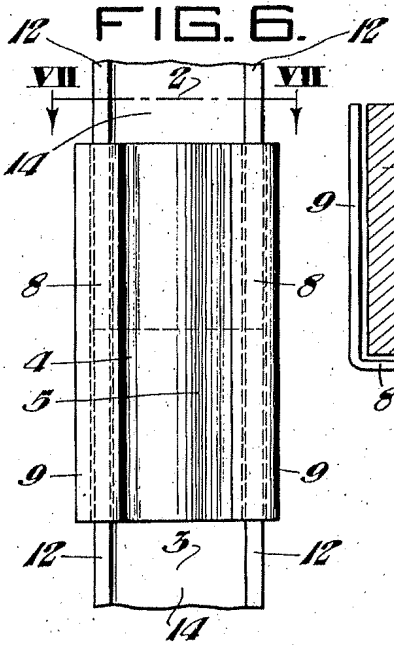


FIG. 7.

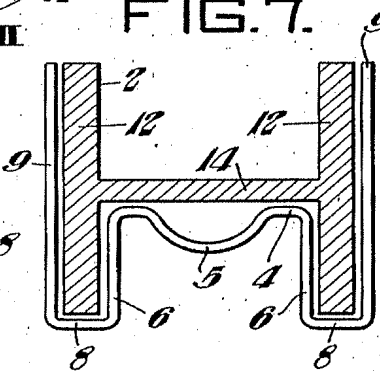
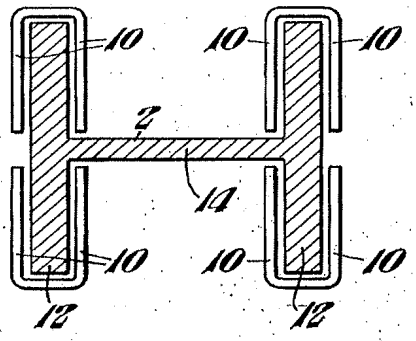


FIG. 8.



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their Attorney.

Patented Sept. 22, 1942

2,296,336

UNITED STATES PATENT OFFICE

2,296,336

SPLICE FOR STRUCTURAL SHAPES

Edward G. Crozier, deceased, late of Munhall, Pa., by Rhea G. Crozier, Munhall, Pa., and Monongahela Trust Company, Homestead, Pa., executors, and Raymond P. Pennoyer, Pittsburgh, Pa.; said executors of Edward G. Crozier, deceased, assignors to Rhea G. Crozier, Marietta, Ohio

Application July 18, 1939, Serial No. 285,222

1 Claim. (Cl. 61—53)

This invention relates to a splice for joining two rolled steel structural shapes end-to-end, and particularly structural shapes used as bearing piles.

An object of the present invention relates to the provision of a splice for bearing piles which can be made adjustable by expansion or contraction of the splice, so as to compensate for commercial tolerances developed in the manufacture of the structural shapes forming the bearing pile.

Another object of the present invention is to provide a splice capable of being expanded or contracted so as to bear tightly against the surfaces of the structural shapes being spliced without rupturing the metal.

Other objects and advantages will become apparent as the description proceeds and reference is had to the accompanying drawing, in which:

Figure 1 is a front elevation of the splice of the present invention applied to adjoining structural bearing pile members;

Figure 2 is a section on line II—II of Figure 1, showing the relative position of the splice members with respect to the structural shape prior to applying force or pressure for expanding the same into contact with the surfaces of the structural members;

Figure 3 is a section similar to Figure 2, showing the splice members tightly engaging the surfaces of the structural bearing pile members after pressure has been exerted to expand the same;

Figure 4 is a view similar to Figure 2, showing another form of construction for the splice members;

Figure 5 is a view similar to Figure 3, showing the splice member of Figure 4 expanded after force has been applied at the edge corrugations;

Figure 6 is a front elevation of another form of splice;

Figure 7 is a section on line VII—VII of Figure 6; and,

Figure 8 is a transverse section of a further form of splice construction in which pressure is applied to contract the splice members so as to tightly engage the surfaces of the structural sections.

In the drawing, the numerals 2 and 3 represent conventional rolled steel H or I-beam structural shapes used as bearing pile sections. In the illustration in Figures 1 to 3, inclusive, the splice of the present invention comprises a unitary metallic member 4 formed by a rolling, pressing, forging or casting operation and includes a longitudinally extending centrally located corrugation 5 and arms 6 extending laterally in the same direction as the corrugation to form a substantially U or channel-shaped cross-section. One of these splice members 4 is positioned on each side of the structural bearing pile section and secured thereto in any conventional manner, such as, for example, by bolting, riveting, welding or any combination thereof.

It is the practice to first drive a shorter length bearing pile into the soil until the top is driven down to any convenient elevation. The splice is usually then secured to the top portion of such bearing pile, after which another bearing pile section is positioned in end-to-end relation with the lower bearing pile section, so that it likewise is encompassed or contacted by the splice, thus enabling driving operations to continue.

Under the prior conventional practice, difficulty has been experienced in that the splice intended for use on the particular installation does not always conform to the size of the structural members as measured in a transverse plane, due to variations commonly known as tolerances which are developed in the commercial manufacture of the structural shapes from which the pile sections are made. However, under the present invention, the bearing pile splice is of such a form and construction that it can be adjusted, within limits, by application of tension or pressure to the corrugation 5, so as to expand or contract the splice member 4 and thus compensate for the commercial variations or tolerances above mentioned. This pressure or force which is applied to the corrugation 5 will so condition the splice member 4 that all surfaces of the splice, so far as possible, will be brought to bear as tightly as necessary against all of the corresponding surfaces of the structural bearing pile sections to be spliced. After the pressure or force has been applied to the corrugation 5 of each splice member 4, the same will assume the position clearly shown in Figure 3, after which any conventional method of attaching the splice to the rolled steel bearing pile sections may be used.

The splice member 4, which is positioned on each side of the structural shape, may be rolled, pressed, forged or cast, as shown in Figures 4 and 5. In this construction, the splice 4 is provided on each end with inwardly pressed corrugations 7 and includes a straight bottom portion interconnecting the corrugations, while the flanges 6 extend outwardly, as in Figure 2, to form a substantially U or channel-shaped cross-section. In this construction, the force or pressure is applied to either corrugation as may be desired, or, if necessary, to both of the corruga-

tions, depending entirely upon the commercial tolerances present in the bearing pile section being used. After pressure is applied to the corrugation or both corrugations, as may be desired, the splice on each side of the surface of the commercial shape is expanded so that all surfaces of the splice, so far as possible, are brought to bear as tightly as necessary against all of the corresponding surfaces of the structural bearing pile sections to be spliced, as clearly indicated in Figure 5.

In the illustration in Figures 6 and 7, substantially the same construction is provided as in Figure 2, except that the flanges 6 are bent at right angles to provide a portion 8 adapted to contact the edge of the structural bearing section, and then bent rearwardly at 9 to provide a flange in spaced parallel relationship to the flanges 6, which flange 9 is adapted to contact a surface of the structural bearing pile section.

In Figure 8, there is shown a modified form of the invention in which the splice comprises a rolled, pressed, forged or cast metal piece having a U or channel-shaped cross-section. In this form of the invention, one of these U or channel-shaped cross-sectional members is positioned over the edges of each flange of the bearing pile sections, and each splice member is adjustable to compensate for commercial tolerances by applying a force or pressure to the arms 10 in order to contract the splice member so that all surfaces, so far as possible, are brought to bear as tightly as necessary against all of the corresponding surfaces of the structural bearing pile sections to be spliced.

In this modification of Figure 8 the U-shaped splice members are positioned over edges of the flanges 12, and, by pressure being applied to the flanges 10 of the splice, the same are contracted to bear tightly against the inner and outer surfaces of said flanges 12.

In the present showings, the splice is illustrated as being applied to an H or I-shaped structural member. In the form of the invention shown in Figures 1 to 3, inclusive, the splice is positioned between the flanges 12 so that the flanges 6 of the splice members, which are positioned on each side of the web 14, may contact the inner surfaces of the flanges 12 of the H or I-beam member upon force being applied to the corrugation 5, so as to expand the splice member transversely for engaging the inner surfaces of the H or I-beam member.

In the showing in Figures 4 and 5, the flanges 6 of the splice member are expanded to contact the inner surfaces of the flanges 12 when force is applied to either one or both of the corrugations 7. In both cases, the splice is contained within the confines of the edge extremities of the flanges and between the web and the flanges.

It will be observed that, from the foregoing constructions, the splice of the present invention extends over more than one surface of the structural shape and that the splice is capable of being adjusted within limits by the application of pressure so that all surfaces of the splice, so far as possible, are brought to bear as tightly as necessary against all of the corresponding surfaces of the structural members forming the bearing pile sections. An important feature of the present invention resides in the fact that it is possible to use a single splice for various sizes of structural shapes used for piling sections within reasonable commercial tolerances, and that the magnitude of force or pressure applied, for expanding or contracting the splice members to tighly bear against all of the surfaces of the structural shapes, is insufficient to rupture the metal forming the splice.

A metallic splice which extends over more than one surface in one integral piece has considerable value, especially in the case of structural shapes in bearing piles. The advantages of having the splice adjustable in size affords an opportunity to overcome the commercial variations developed in the manufacture of structural shapes used for bearing pile structures.

Regardless of whether the pile is considered as a beam or a column, it is important, from the standpoint of maximum efficiency and utility, that the ends of the splice shall make firm contact during the driving so as to strengthen or reenforce the pile at the juncture of the two pieces. It is important that all surfaces of the splice must firmly contact the mating surfaces of the structural shapes forming component parts of the pile. Due to the unavoidable variations in the commercial product of structural shapes, it has heretofore been impossible to produce satisfactory metallic splices by use of rolls, dies or patterns which would properly seat or make contact with the surfaces on three or more faces of the stock forms of commercially produced structural shapes. However, under the present invention, there is provided a splice which can be adjusted to compensate for commercial variations without rupturing the metal forming the splice. In each instance, the bearing splice is attached in any conventional manner to the bearing pile sections by bolting, riveting, welding, or any other combination thereof.

While we have shown and described specific embodiments of the present invention, we do not wish to be limited exactly thereto, since various modifications may be made without departing from the scope of the invention, as defined by the following claim.

We claim:

A splice for connecting the abutting ends of superimposed rolled H or I-shaped bearing pile sections, comprising a pair of continuous metal splice members disposed vertically along the sections, each of the splice members having a pair of flanges extending vertically along the inner faces of the flanges of the sections and having connecting portions between the splice flanges extending vertically along the webs of the sections, each of said splice members having corrugations therein extending vertically thereof at the junctures of their flanges and connecting portions permitting selective transverse displacement of said flanges and connecting portions throughout the vertical length thereof into intimate contact with the said faces of the section flanges and the webs thereof upon the application of pressure to said corrugations, said members extending vertically across the juncture of the sections and being secured thereto whereby to provide rigid aligning and load-bearing connections with and between the sections.

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RAYMOND P. PENNOYER.

United States Patent [19]

Stillman, Jr.

[11] **4,261,436**

[45] **Apr. 14, 1981**

[54] **METAL LADDER AND METHOD OF FABRICATING THE SAME**

[75] Inventor: **Harold W. Stillman, Jr.**, Clarendon Hills, Ill.

[73] Assignee: **Sears, Roebuck and Co.**, Chicago, Ill.

[21] Appl. No.: **112,758**

[22] Filed: **Jan. 17, 1980**

Related U.S. Application Data

[62] Division of Ser. No. 956,175, Oct. 30, 1978, Pat. No. 4,205,426.

[51] **Int. Cl.**[3] **E06C 7/08**

[52] **U.S. Cl.** **182/194**; 182/219; 182/228; 29/512

[58] **Field of Search** 182/228, 194, 215, 217, 182/218, 219, 220; 29/512

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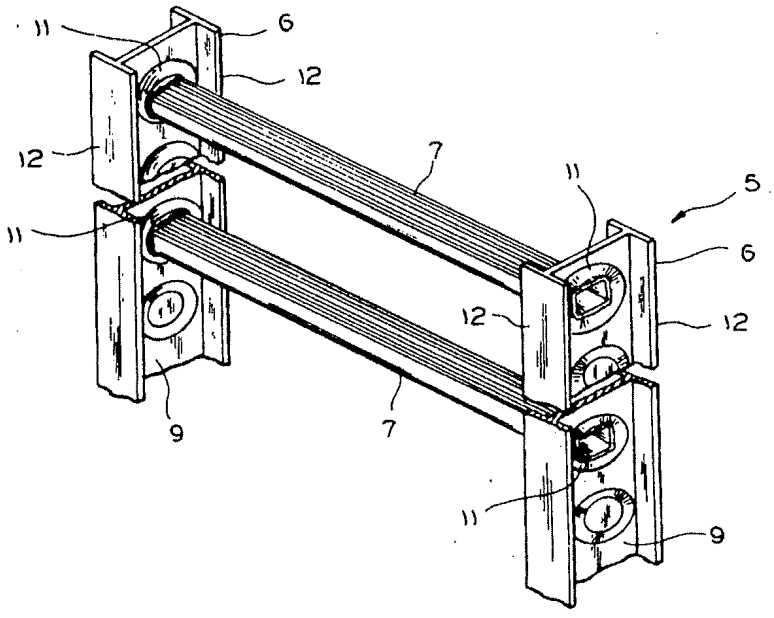
Primary Examiner—Reinaldo P. Machado

Attorney, Agent, or Firm—Arnstein, Gluck, Weitzenfeld & Minow

[57] **ABSTRACT**

A metal ladder is fabricated from a pair of spaced rails in which the rails have web portions which are provided at spaced intervals with inwardly directed embossments. Each of these embossments has an opening into which one end of a tubular rung is inserted and swaged to the rail. The embossments act as ribs to carry the load toward the flanges constituting the stiffer portions of the rail thereby increasing the strength and effectively reducing the web flexure and angle changes between the rungs and the rails, due to sideward forces in ladder use. By reason of the built in stiffness web thickness may be reduced resulting in savings in materials. Additionally, intermediate these embossments, just described, the web portion of each rail is formed with one or more outwardly directed embossments.

5 Claims, 9 Drawing Figures



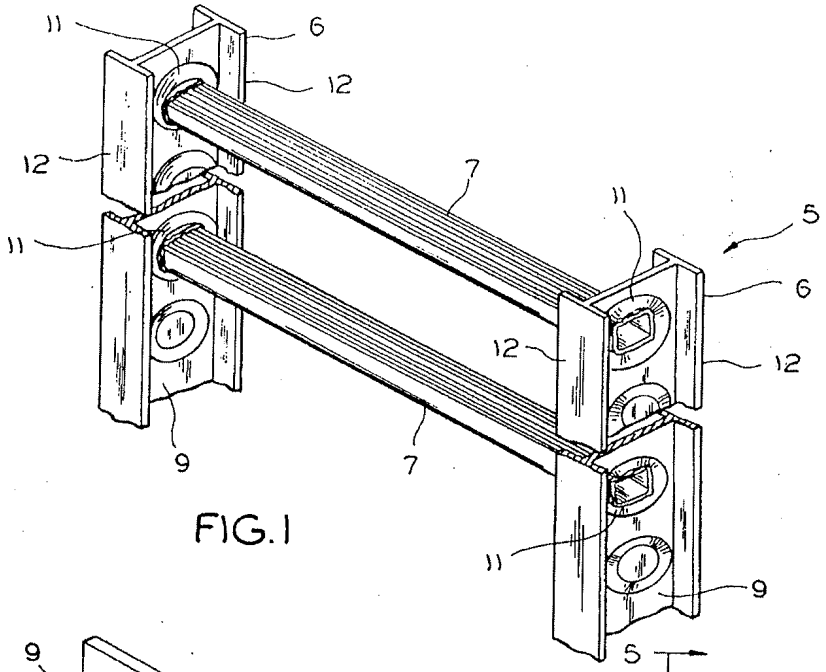


FIG. 1

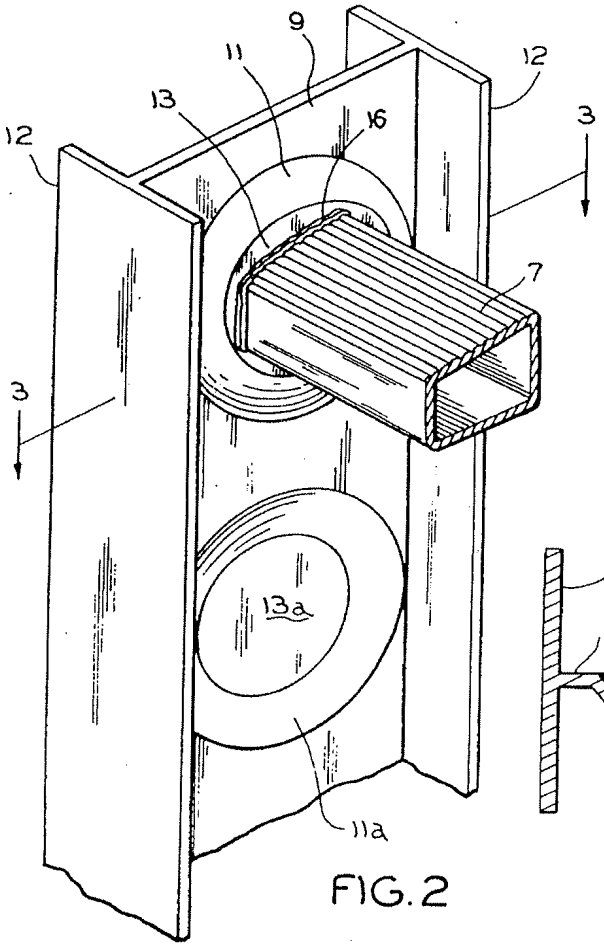


FIG. 2

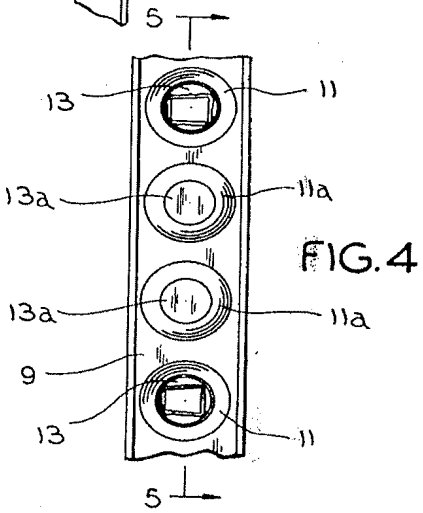


FIG. 4

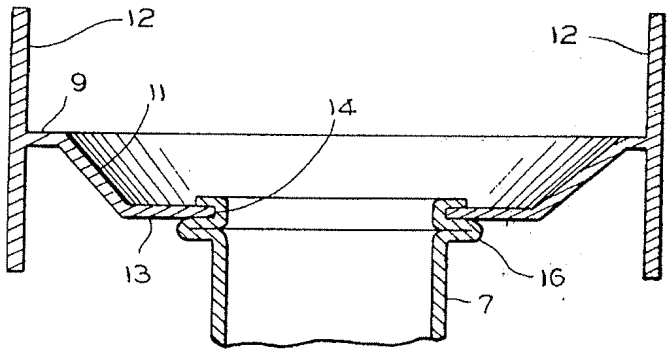


FIG. 3

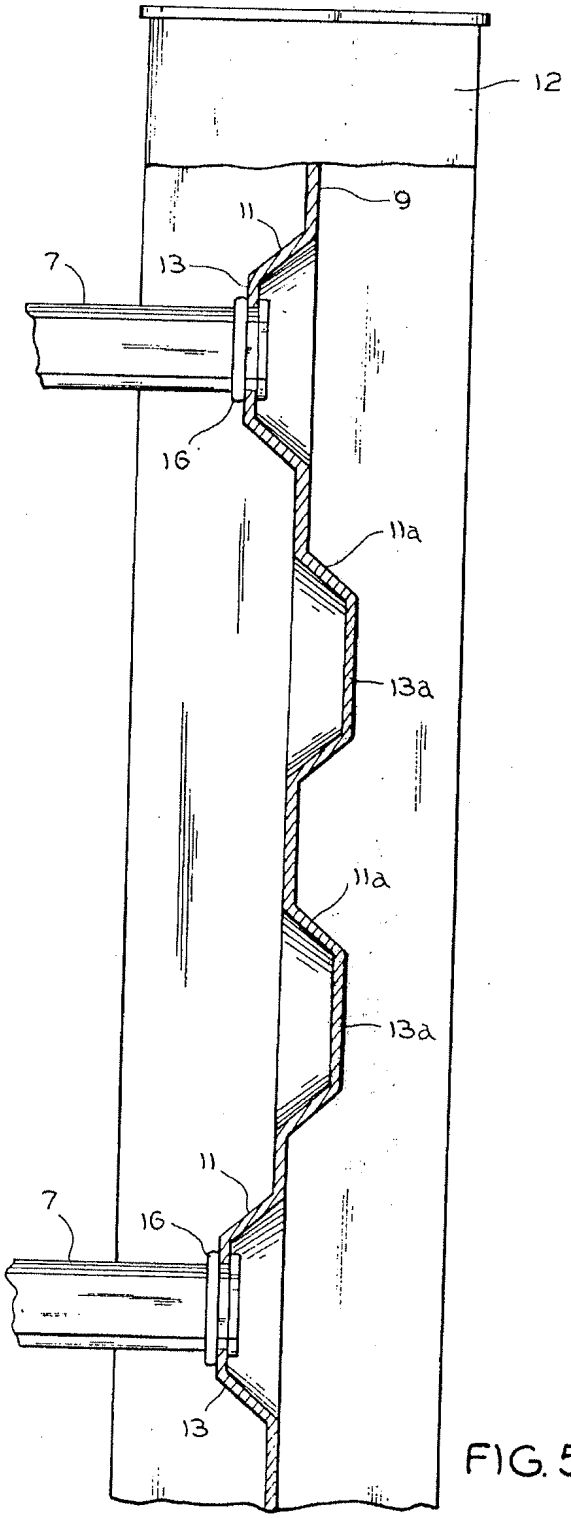


FIG. 5

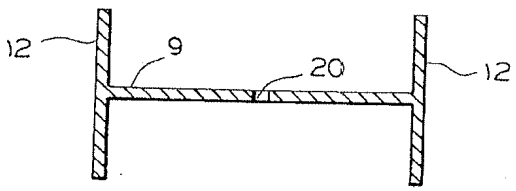


FIG.6

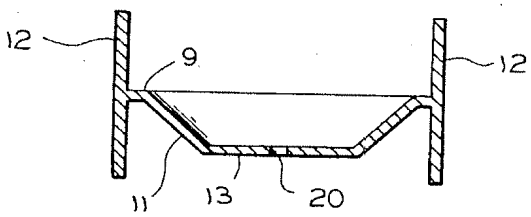


FIG.7

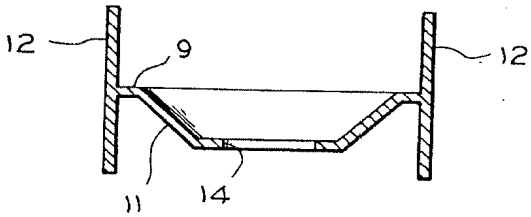


FIG.8

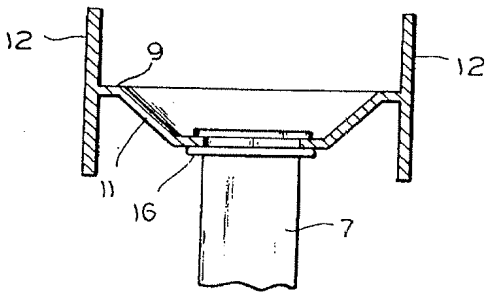


FIG.9

METAL LADDER AND METHOD OF FABRICATING THE SAME

This application is a division of application Ser. No. 956,175 filed Oct. 30, 1978, for a Metal Ladder and Method of Fabricating the Same and now U.S. Pat. No. 4,205,426.

My invention relates to improvements in metal ladders and to a method of fabricating the same.

Typical metal extension ladders are formed of extruded side rails which have I-beam or channel configurations and webs to which the rungs are attached. Such webs are flat planes and usually are maintained at minimum thickness consistent with practical extruding and acceptable engineering practices to prevent web crippling tendencies in bending. The most common method of attaching a rung to the rail web is by swaging an end of the rung to the flat web of the rail. In a modified method employed in some ladders, a soft collar of metal is swaged around the rung and to the web. The resulting ladder assembly laterally is similar to a Vierendeel truss which is a low efficiency truss depending on the rigidity of the joints for strength.

In U.S. Pat. No. 3,388,454 to Willis, there is disclosed a method of fabricating metal ladders in which the rung is connected to the web in a single operation. The patent teaches a method of first forming a hole in flat web of the rail and inserting the rung in the hole. Then both the inner and outer beads on the rung, as well as the embossing surrounding the rung are formed in a single operation. Obviously, the hole provided must have the same configuration as the perimeter of the rung. However, when the web is deformed in the embossing operation the metal will be pulled away from the hole, changing the configuration of the hole. This is likely to result in a loose connection between the rung and the rail after final swaging.

The swaging of the rung and embossing of the web in a single operation, as above described requires that the rails be processed while in a tempered state because subsequent tempering of a complete ladder, after fabrication, is not economical or space efficient. If a tempered rail is used in accordance with the method of the patent the low elongation characteristics of the aluminum will likely distort the rail. Further, the method as taught in the patent does not take into account the inherent increase in web thickness to provide greater strength as the length of the ladder is increased. It should be apparent that webs having a thickness greater than the minimum thickness associated with usual extruded sections normally will not be capable of being embossed.

SUMMARY OF THE INVENTION

The present invention overcomes the deficiencies of prior art structures and methods by securing each end of a rung in an embossed area formed in the web of the rail through a series of separate steps. The hole which receives the rung is formed in the embossment subsequent to the embossing operations so as to avoid deformation of the rung hole. Because the center portion of the web has localized flexing when sideward loads are applied due to parallelogramming action, the embossed web portion acts as a beam to carry the load toward the stiffer flange areas. Tests have shown, in ladders constructed in accordance with my invention, that side sway can be reduced by at least fifty percent under that experienced with conventional type ladders. Also, it has been found that the strength of the rung is considerably improved because the rung in bending acts more like a fixed beam.

In normal bending a rail may fail by buckling between the rungs. Because of the increased strength of the joints between the rungs and the webs, it is desirable to improve the strength of the rails to obtain an overall improved ladder and this may be effected by embossing the webs in the areas intermediate the rungs to increase bending strength. Such intermediate embossing are directed outwardly, opposite from the embossings carrying the rungs which are directed inwardly.

A significant saving in material is effected in the construction of a ladder in accordance with my invention. Due to the embossing of each rail, the web is moved inwardly a short distance approximately $\frac{1}{4}$ inch. As a result, each rung which is disposed between aligned embossments may be reduced approximately $\frac{1}{2}$ inch in length for the same usable size ladder. In addition, web thickness may be reduced without reduction in rail strength or stiffness.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a fragmentary perspective view of a portion of a ladder, in accordance with my invention.

FIG. **2** is a fragmentary perspective view, on an enlarged scale, of a step or rung in assembled relation with a stile or rail.

FIG. **3** is a cross sectional view, on an enlarged scale, taken substantially on line **3**—**3** of FIG. **2**.

FIG. **4** is a fragmentary elevational view of a ladder rail, in accordance with my invention.

FIG. **5** is a longitudinal vertical cross sectional view, on an enlarged scale, taken substantially on line **5**—**5** of FIG. **4**.

FIGS. **6** through **9** are transverse cross-sectional views of a rail showing the progressive steps employed in constructing a ladder, in accordance with my invention.

BRIEF DESCRIPTION OF A PREFERRED EMBODIMENT

The ladder **5**, according to my invention, comprises a pair of rails or stiles **6** arranged in parallel relation and connected by a plurality of transverse steps or rungs **7**. The rails **6** are structurally identical and are formed of extruded aluminum or any other suitable metal. While the rail **6** is illustrated as having an I-beam cross section, it will be understood that the invention is applicable to a web of conventional channel or sigma cross sectional shape, the latter being shown in my U.S. Pat. No. 3,491,853.

At spaced intervals, corresponding to the conventional distance between the steps or rungs, the web **9**, as will be hereinafter described, is stamped or pressed out of its plane to form embossments **11** providing a rib effect between the flanges **12**. These embossments **11** are disposed on the inner side of the web **9**. Intermediate each pair of embossments **11** and web **9** are two embossments or ribs **11***a* which are disposed on the outer side of the web **9**. Thus, each of the embossments or ribs **11** which carry the rungs **7** is inwardly directed on the rail, while each of the intermediate embossments or ribs **11***a* is outwardly directed. Each of the embossments **11**, **11***a* is located medially of the flanges **12**. In a specific example considered, in a rail where the width of the web **9** between the flanges **12** was $2\frac{5}{8}$ ins. the depth of the

embossment **11**, **11***a* was approximately ⅜ ins. The embossments **11**, **11***a* may have a frustum or concavo-convex formation. However, in each case the deepest or central portion **13** of the embossment is flat and is disposed in a plane parallel to the plane of the web **9**. Preferably, each embossment **11**, **11***a* should be of such size in relation to the width of the web **9** that its periphery is as close as practicable to the flanges **12** consistent with approved fabrication techniques. The central flat portion **13** of each embossment **11**, is provided with an opening **14** in the form of a trapezoid to receive the rung **7**, hereinafter to be described. It is noted that the embossments **11***a* are not provided with openings in the corresponding flat portions **13***a*.

Because of improved rigidity and strength characteristics which result from the present invention, I have found that a rail having a web thickness of 0.044 in. which includes the embossments **11**, **11***a* has the same comparative strength as a rail having a web thickness of 0.064 in. without the embossments. Clearly, this results in a substantial saving in material in addition to other benefits. For example, the rail depth between flanges **12** may be increased without an increase in web thickness. The increased rail depth provides an increase in rail stiffness which results in a reduction in deflection under load. Thus, a stiffer and lighter ladder is easier to climb and safer to handle. Also, it is noted that by reason of the savings in material substantial saving in the use of valuable energy required to produce aluminum is effected.

The rungs **7** are of conventional construction preferably, being formed of extruded aluminum tubing. In this instance, the cross section configuration of the rung is trapezoidal, although it will be understood that it may have any suitable shape.

FIGS. **6** through **9** show the sequence of steps in the construction of a ladder in accordance with my invention. As seen in FIG. **6**, the web **9** of each rail **6** is drilled or punched to provide a series of longitudinally spaced pilot holes **20**. These holes are located medially of the flanges **12** and at spaced points, each corresponding to the location of a rung **7**. The web portion **9** surrounding each hole is displaced by conventional stamping means to one side of the web corresponding to the inner side of the rail, to form an embossment **11**, shaped substantially as illustrated in FIGS. **3**, **5** and **7**. The embossment includes a flat surface **13** substantially concentric with the pilot hole **20** and parallel to the plane of the web **9**. In the next step, as shown in FIG. **8**, the flat portion **13** is stamped to provide an opening **14** corresponding to the configuration of the rung **7**, preferably in the form of a trapezoid, although, it will be understood that the opening **14** may have any suitably configuration to accommodate a particular rung. In any event, the opening **14** is suitably shaped to snugly receive the rung **7**.

Advantageously before the rungs **7** are assembled with the rail **6** the embossments **11***a* are stamped in the web **9**. Two of such embossments **11***a* which are directed oppositely from the embossments **11** are provided between each pair of adjacent rungs **7** and may be formed by utilizing the same tools as employed for the embossments **11**. Prior to assembly of the rung **7** to the rail, each rung **7** is first swaged at each end to provide a double walled shoulder **16** spaced from the end edge of the rung, as shown in FIG. **3**. This shoulder **16** is intended to abut the inner face of the flat portion **13** and to overlap the marginal edge surrounding the opening **14**. The end portion of the rung **7** is then passed through opening **14** and in the final operation is swaged to abut and overlap the marginal edge surrounding the opening **14** on the outer face of the flat portion **13** of the embossment, as seen in FIGS. **3** and **9**.

I have found that in a ladder constructed in accordance with my invention the rigidity of the joint between the rung **7** and rail **6** is very substantially improved. Normally, the central portion of the web **9** due to parallelogramming action is subjected to the greatest flexure when sideward stresses are applied. In the present invention it is believed that each embossed web portion **11**, **11***a* acts as a beam to carry the load towards the more rigid areas adjacent the flanges **12** of the I-beam and also the rung **7** acts in the nature of a fixed end beam in bending.

The use of my invention will result in a ladder of improved structural strength over conventional ladder constructions having corresponding dimensions. Accordingly, if it is desired to equally match the structural characteristics of a conventional ladder with a ladder embodying my invention, such a ladder may be constructed of rail members having cross sections of reduced thicknesses thereby providing a ladder lighter in weight and utilizing less material than a corresponding conventional ladder.

Various changes coming within the spirit of my invention may suggest themselves to those skilled in the art; hence, I do not wish to be limited to the specific embodiments shown and described or uses mentioned, but intend the same to be merely exemplary, the scope of my invention being limited only by the appended claims.

I claim:

1. A metal ladder comprising a pair of spaced side rails each having a web portion, each of said web portions being provided at spaced intervals with first embossments and with respective pairs of first embossments being disposed in confronting relation to each other, each of said first embossments having a flat central portion having an opening substantially centrally thereof, a series of tubular rungs having their end portions respectively inserted into opposed pairs of openings and secured therein, each of said web portions having second embossments adjacent each rung with said second embossments being directed oppositely from the direction of said first embossments.

2. The invention as defined in claim **1** in which the first embossments are directed inwardly towards each other.

3. The invention as defined in claim **1** in which the ends of the rungs are swaged to respective first embossments to secure said rungs and side rails firmly together.

4. The invention as defined in claim **1** in which the embossments are in the form of a frustum.

5. The invention as defined in claim **1** in which the embossments are concavo-convex in form.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 4,261,436
DATED : April 14, 1981
INVENTOR(S) : Harold W. Stillman, Jr.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

ON THE TITLE PAGE

INID NUMBER [54] after "LADDER" delete AND METHOD OF FABRICATING THE SAME

IN THE SPECIFICATION

Column 1, lines 2 and 3, after "LADDER" delete AND METHOD OF FABRICATING THE SAME

Column 1, line 8, after "4,205,426" delete the period and in place thereof insert --, which is a continuation-in-part of Application Serial No. 867,137, filed January 5, 1978, now abandoned.--.

Signed and Sealed this

Seventh Day of *July 1981*

[SEAL]

Attest:

RENE D. TEGTMEYER

Attesting Officer

Acting Commissioner of Patents and Trademarks

US005275257A

United States Patent [19]

Robertson

[11] Patent Number: 5,275,257

[45] Date of Patent: Jan. 4, 1994

[54] PORTABLE NATURE STAND

[76] Inventor: H. Eugene Robertson, Thomson, Ga.

[21] Appl. No.: 217

[22] Filed: Jan. 4, 1993

[51] Int. Cl.[5] E06C 1/10

[52] U.S. Cl. 182/116; 182/187

[58] Field of Search 182/187, 188, 116, 92, 182/20; 108/52

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5,105,910	4/1992	Engstrom	182/187

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Primary Examiner—Alvin C. Chin-Shue
Attorney, Agent, or Firm—Watson, Cole, Grindle & Watson

[57] ABSTRACT

A portable nature stand having a seat which can be turned through three hundred and sixty degrees, a platform, and one or more ladder sections connected to and extending downwardly from the platform at an acute angle to the upper surface of the platform.

20 Claims, 3 Drawing Sheets

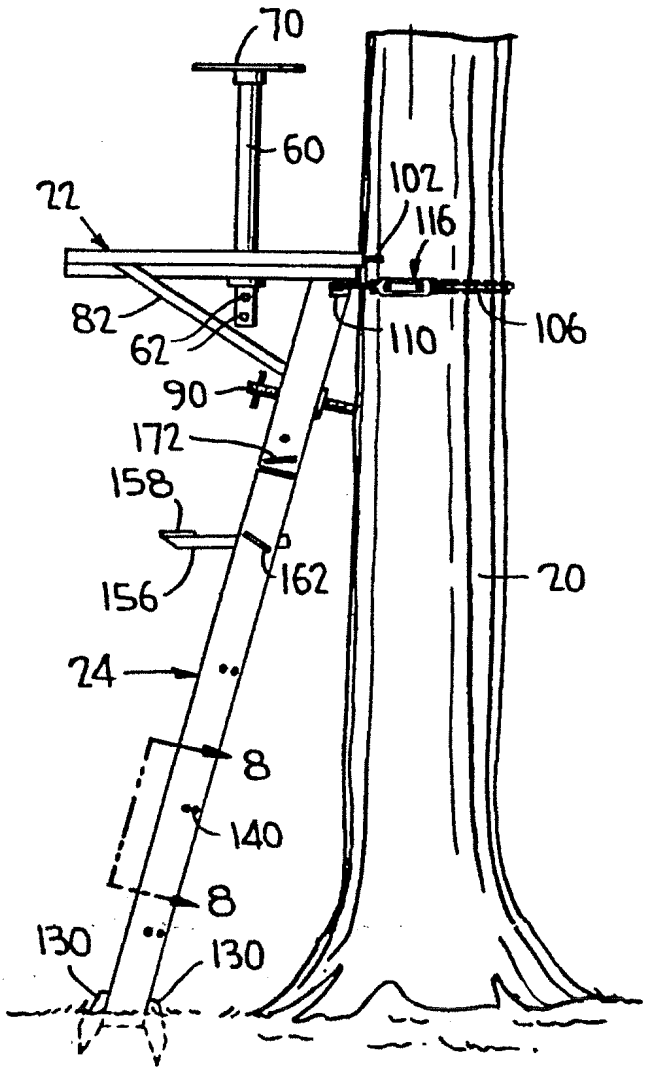


FIG. 1

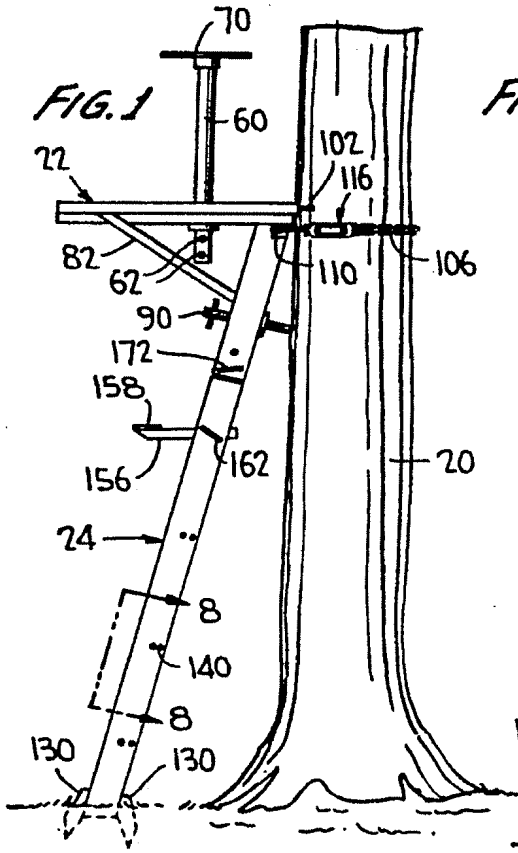


FIG. 2

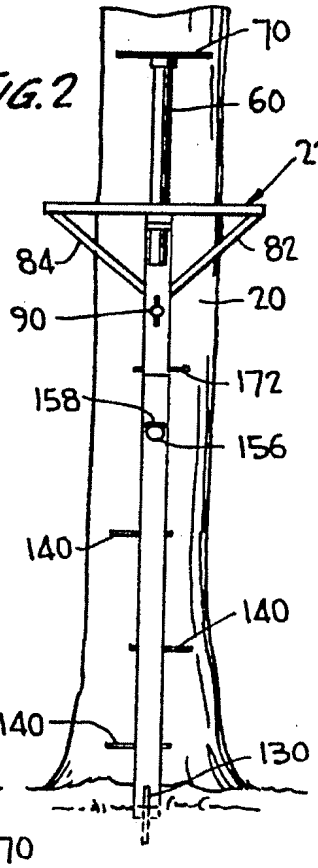


FIG. 3

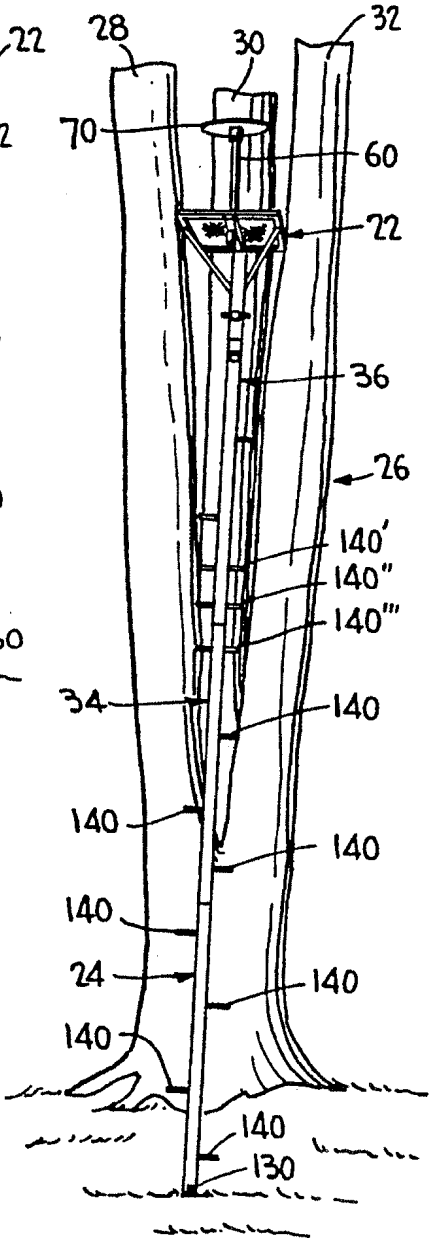
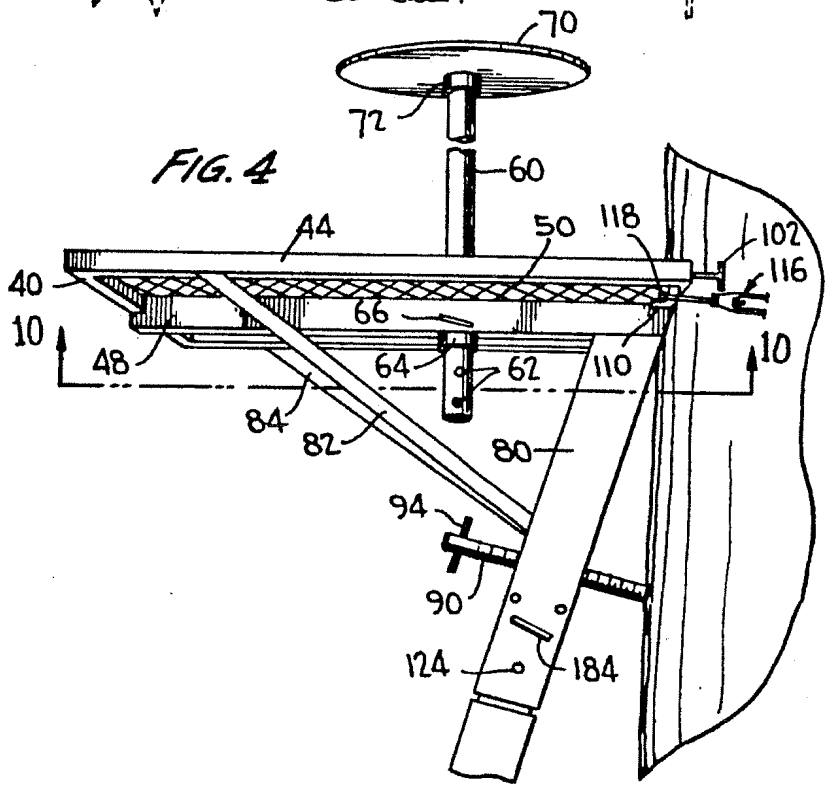


FIG. 4



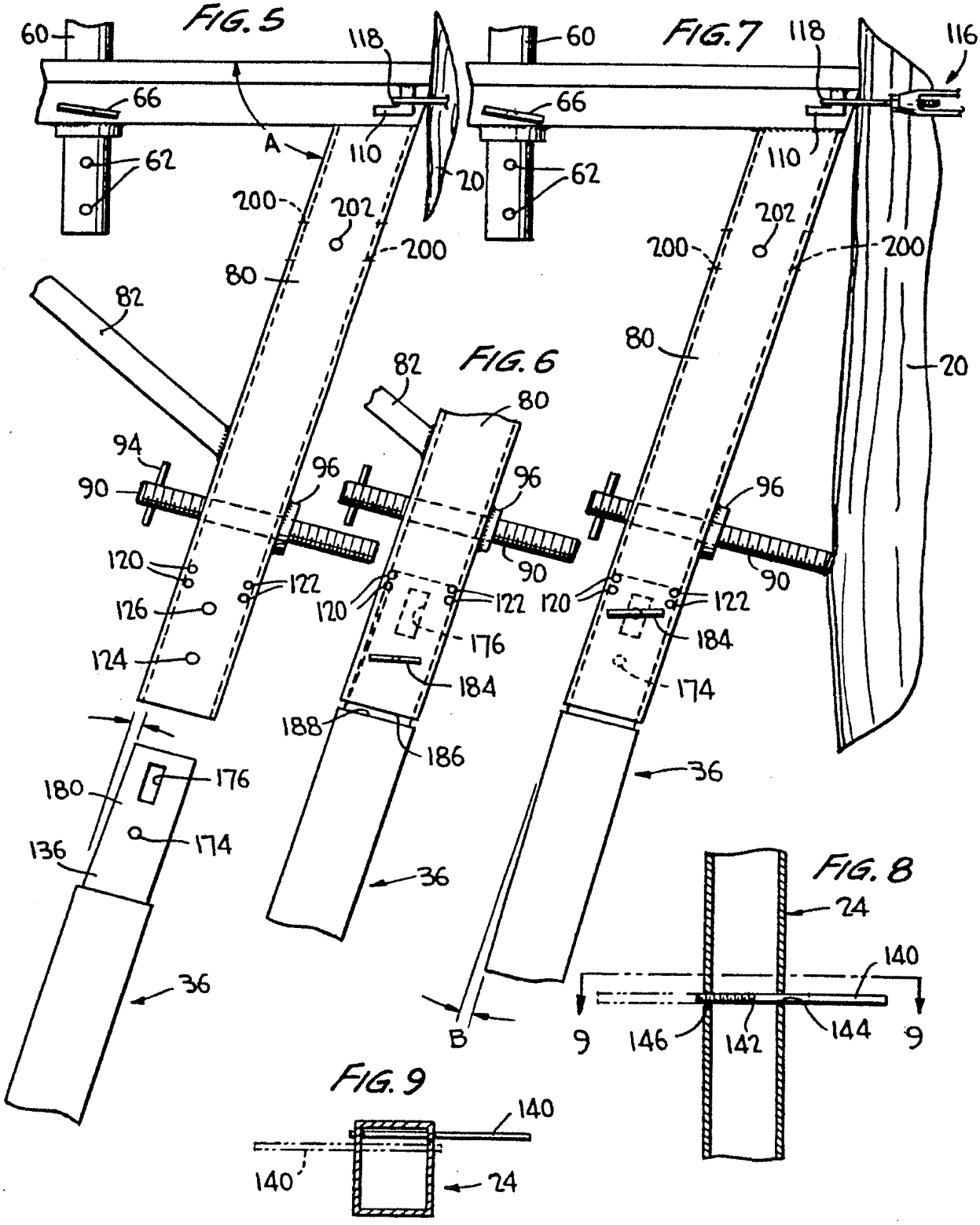


FIG. 5
60
66
62
118
A
110
20
200
202
200
80
82
94
90
96
120
122
126
124
176
180
136
174
36
FIG. 6
82
80
96
120
122
176
184
188
186
36
FIG. 7
60
66
62
118
116
110
200
202
200
80
20
96
90
120
122
184
174
36
B
FIG. 8
24
140
9
146
142
144
9
FIG. 9
140
140
24

FIG. 10

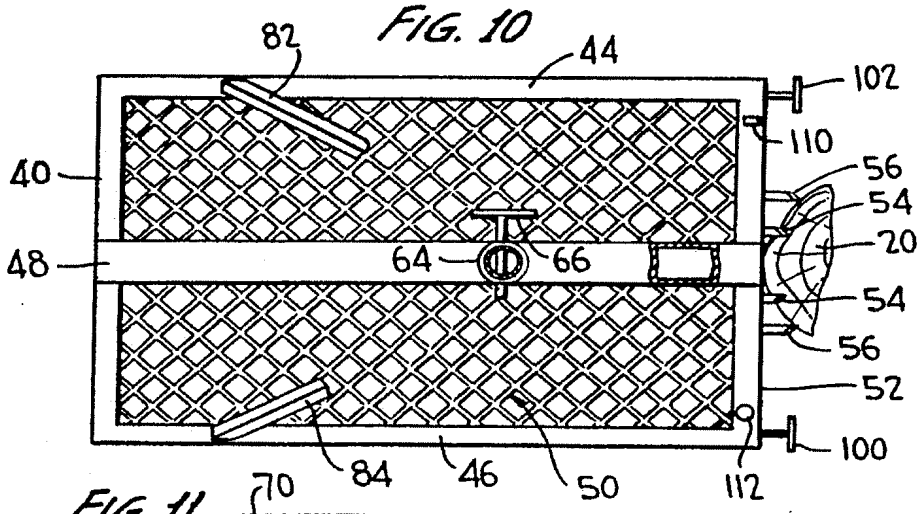


FIG. 11

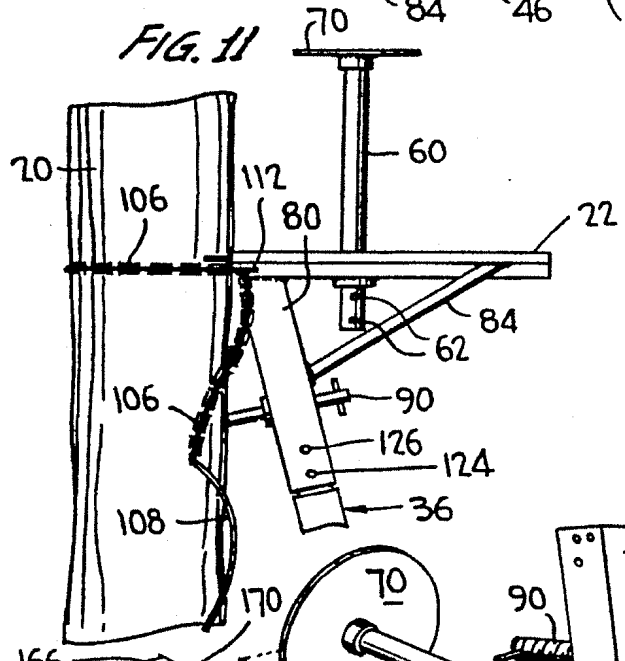
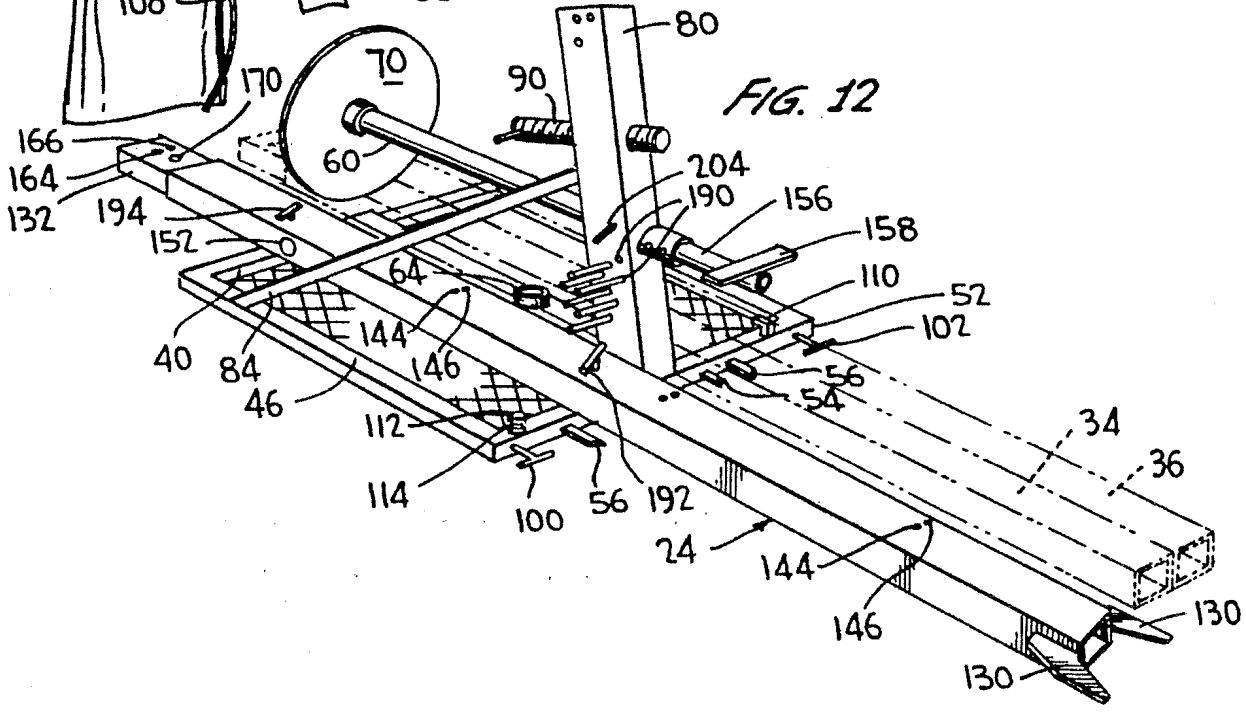


FIG. 12



PORTABLE NATURE STAND

BACKGROUND OF THE INVENTION

The present invention relates to a portable nature stand, and more particularly to a stand of the type which can be transported into an area such as a forest having many trees and which can be easily mounted in operative position so as to provide a safe and comfortable vantage point from which to observe nature. Such stands are used by photographers or hunters and are often referred to as a deer stand or tree stand.

Stands of this type can, of course, also be employed with upright wooden poles or the like, but the most common use is with trees having a diameter on the order of five inches or more. The stand should be of lightweight construction and be capable of being readily assembled and disassembled without the use of any tools. Nature stands are utilized with trees of many different sizes and configurations. Prior art stands have the disadvantage that they often are not suitable for use with trees having unusual shapes and trees that have many low branches or divided trunks. Furthermore, prior art stands make undesired noises or may have components thereof damaged upon movement of the associated tree caused by wind. It is therefore desirable to eliminate any undesired noises and possible damage to the stand irrespective of movement of the tree to which it is attached.

SUMMARY OF THE INVENTION

The invention stand is made entirely of aluminum to provide maximum strength with minimum weight, thereby enabling the entire stand to be carried by a single person. The components of the stand can be disposed in a compact carrying mode arrangement and then readily assembled and connected to a tree when desired. Assembly and disassembly of the stand can be done manually without the necessity of employing tools of any kind.

The stand includes seat means which can turn through three-hundred and sixty degrees of movement, and means is provided to adjust the vertical height of the seat means. The stand includes a platform means upon which a person can stand; and one or more ladder sections are connected to the platform means and extend downwardly to the ground from the lower part of a tree-engaging edge portion of the platform means at an acute angle to the upper surface of the platform means. A plurality of ladder sections which can be detachably interconnected with one another are provided for mounting the platform means at various heights. This novel construction of the platform means and the manner in which the ladder sections are connected therewith enable the stand to be effectively used with trees of of many different sizes and configurations including trees with many low branches and divided trunks.

The ladder sections are telescopically engaged with one another and are connected together by suitable bolts. The base portion of the lowermost ladder section is provided with stabilizing prong means embedded in the ground to keep the ladder sections from twisting as a person initially climbs the ladder sections to secure the stand to a tree.

In the preferred embodiment, three ladder sections are provided so that the platform means may be supported at three different heights. The platform means is

secured to a tree by a flexible chain extending around and engaging the tree. In addition, spikes formed on the tree-engaging edge portion of the platform means are adapted to be embedded in a tree to hold the platform means in place. These spikes have chisel-like tips thereon which will prevent undesired noise from being generated when an associated tree is moved to and fro by wind.

Removable steps are proved on opposite sides of the ladder sections and staggered vertically with respect to one another. When the stand includes two or more ladder sections, a first double step is formed at the lower part of the uppermost ladder section, a second double step is formed at the joint between the uppermost ladder section and the ladder section immediately therebelow, and a third double step is formed at the top of the last-mentioned ladder section. These double steps enable a person to stand in a balanced position when installing the chain around the tree to secure the stand in position. An auxiliary step is provided a suitable distance below the platform means which allows a person to easily climb onto the platform means. This step extends in a direction generally perpendicular to the direction of the removable steps.

When two or more ladder sections are employed, stabilizer means and a movable interconnection between the lower end of a depending portion of the platform means and the upper end of the uppermost ladder section ensure that the stand will operate properly and will not be damaged by movement of the tree by wind. This arrangement ensures that the tree and the platform means secured thereto can move independently of the ladder sections.

The stabilizer means is engageable with an associated tree and is adjustably supported by a depending portion of the the platform means. The stabilizer means is used to swing the platform means upwardly to take the load off of the movable interconnection which can then function in its intended manner to permit relative movement can then function in its intended manner to permit relative movement of the tree and platform means with respect to the ladder sections The movable interconnection includes a bolt extending through an elongated slot formed in the uppermost ladder section thereby forming a lost-motion connection to effect the desired end result.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of the nature stand employing only one ladder section and secured in operative position on a tree;

FIG. 2 is a front view of the structure shown in FIG. 1;

FIG. 3 is a view of the nature stand employing three ladder sections and secured in operative position on a tree having a divided trunk;

FIG. 4 is an enlarged lower perspective view showing the details of construction of the platform means;

FIG. 5 is an exploded view of the depending portion of the platform means and the upper end of the uppermost ladder section;

FIG. 6 is a view showing the movable interconnection in a first position;

FIG. 7 is a view showing the movable interconnection in a second position;

FIG. 8 is an enlarged section taken along line 8—8 of FIG. 1;

FIG. 9 is a section taken along line 9—9 of FIG. 8;

FIG. 10 is a bottom view taken along line 10—10 of FIG. 4;

FIG. 11 is a side view of the platform means from the side opposite to that shown in FIG. 1; and

FIG. 12 is a top perspective view showing the stand in the carrying mode.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIGS. 1 and 2, a tree includes a trunk 20 to which the portable nature stand is secured. The stand includes a platform means indicated generally by reference numeral 22 and a single ladder section 24 which is detachably connected to the ladder means and which has a base part adapted to engage the ground. Referring now to FIG. 3, a tree 26 includes a trunk divided into three sections 28, 30 and 32 which are separated from one another in a random fashion. The stand includes the same platform means 22 and the ladder section 24 engages the ground. An intermediate ladder section 34 and an uppermost ladder section 36 are also provided, these ladder sections being detachably connected to one another as explained hereinafter. The uppermost ladder section 36 has a movable interconnection with the platform means as later described.

Referring to FIGS. 1, 2, 4 and 10, the platform means includes an outer frame formed of front and rear members 40 and 42 respectively, joined at their opposite ends by side members 44 and 46. A central reinforcing frame member 48 extends between the central portions of members 40 and 42. All of the frame members are formed of tubular aluminum and have a rectangular cross-sectional configuration, these members all being welded together to provide great strength to the frame. An expanded metal deck 50 is also formed of aluminum and is welded to upper portions of the frame members discussed above. Deck 50 defines an upper surface of the platform means upon which a person can stand.

As seen in FIG. 10, the platform means includes a tree-engaging edge portion 52 from which extends a first pair of spikes 54 and a second pair of spikes 56. Each of these spikes has a sharpened chisel-like tip thereon The pair of spikes 56 is disposed on opposite sides of the pair of spikes 54, spikes 56 being longer than spikes 54. The spikes are adapted to be embedded in an associated tree when the stand is secured to the tree. Spikes 54 are used for trees of about four to eight inches in diameter, and spikes 56 are used for trees of more than eight inches in diameter The chisel-type tips of the spikes will ensure that the platform means is secured to the tree and that there will be no undesired noise upon movement of the tree or upon movement of a person on the stand.

A seat means is mounted on the platform means and includes a vertical supporting post 60 formed of aluminum and comprising a hollow cylindrical member having a plurality of holes 62 formed through diametrically opposite portions of the post at the lower end thereof. Frame member 48 has a suitable hole formed therethrough which slidably receives the post. A collar 64 formed of aluminum is welded to the under surface of frame member 48 and has a hole formed therethrough slidably receiving and guiding movement of post 60. Opposite vertical walls of frame member 48 have holes formed therethrough for receiving a T-bolt 66 which passes freely through the hole in one of said vertical walls, thence through holes in diametrically opposite portions of post 60, the outer end of the T-bolt having threads thereon and being threaded into a threaded hole in the other of said vertical walls. This arrangement retains the seat means in a particular desired vertical position. All of the T-bolts employed in the invention are formed of aluminum and have threads formed on the outer ends thereof.

The seat means includes a circular seat member 70 formed of aluminum upon which a person sits. A depending cylindrical portion 72 formed of aluminum is welded to the undersurface of member 70 and has internal threads thereon which engage the threads formed on the upper end of post 60. With this construction, the seat may turn through an angle of 360 degrees so that a person may view all of the surrounding area.

The platform means includes a depending portion 80 formed of aluminum and being of tubular construction of rectangular cross-sectional configuration. The upper end of portion 80 is welded to frame member 48 and extends downwardly from the lower portion of the platform means adjacent the tree engaging edge portion 52 at an acute angle of about 75 degrees to the upper surface of the platform means as indicated by angle A in FIG. 5. A pair of aluminum bars 82 and 84 each have one end thereof welded to depending portion 80, the opposite ends of the bars being welded to frame members 44 and 46 respectively to rigidly interconnect the platform frame and depending portion so that a person can be supported on the upper surface of the platform which will lie generally in a horizontal plane.

As seen in FIG. 5, a stabilizer means comprises an externally threaded aluminum pipe 90 having an inner end 92 adapted to engage the outer surface of a tree. A handle 94 is mounted at the outer end of the pipe to facilitate turning of the pipe. The pipe is threaded into an internally threaded aluminum cylindrical fitting 96 which is disposed within suitable holes formed in opposite walls of depending portion 80 and is welded in place. The use of the stabilizer means is explained hereinafter.

As seen in FIGS. 10 and 12, a pair of T-bolts 100 and 102 similar to T-bolt 66 are threaded into suitable holes formed at opposite end portions of the tree-engaging edge portion 52 of the platform means. These two T-bolts serve as a safety means when the stand is first set up against a tree and a person climbs up the stand to secure it to the tree. If the stand is not properly centered on the trunk of the tree, there may be a tendency for the platform means to slide laterally off the tree. T-bolts 100 and 102 will engage the tree if the stand starts to slide laterally and serves to limit such sliding movement, thereby preventing the stand from falling to the ground and possibly injuring a person climbing the stand.

In order to secure the platform means to a tree, securing means includes a conventional flexible link chain 106 having a length of stiff wire 108 connected to one end thereof as seen in FIG. 11. This stiff wire has a length of about two feet and is used to thread the chain around the tree when the platform is initially mounted in position. In order to secure the chain to the platform means, an aluminum hook 110 is welded to the undersurface of frame member 42 adjacent one end thereof, and an aluminum stud 112 having a peripheral groove 114 formed therein is welded to the undersurface of frame member 42 adjacent the opposite end thereof. A conventional turnbuckle device 116 is connected to an end of the chain to tighten the chain in operative position.

After the stand is initially set up against a tree, a person attaches the turnbuckle device to hook **110**, the turnbuckle device having a hook **118** thereon to cooperate with hook **110**. The chain is then passed around the tree using wire **108**, and one link of the chain is placed over stud **112** with the chain link disposed in the peripheral groove in the stud. The turnbuckle is then tightened in the usual manner to secure the platform means to the tree with the spikes on the platform means embedded in the tree to that there will be substantially no relative movement between the platform means and the tree.

As seen in FIG. **5**, the lower end of the depending portion **80** of the platform means includes a first pair of peep holes **120** formed through opposite sides thereof; and a second pair of peep holes **122** is also formed through opposite sides thereof Additionally, two pairs of spaced holes **124** and **126** are formed through opposite sides of the depending portion. The purpose and function of these various holes in the lower end of the depending portion is defined hereinafter.

All of the ladder sections are formed of tubular aluminum of rectangular cross-sectional configuration, and as seen in FIGS. **1** and **12**, the lowermost ladder section **24** has a pair of aluminum prongs **130** secured to opposite sides thereof by welding. These prongs are adapted to be embedded in the ground when the stand is set up against a tree and serve to prevent twisting of the ladder sections of the stand as a person climbs up on the stand. Each of the ladder sections has a tubular aluminum portion at the upper end thereof of less outer dimension so that it is adapted to slide into the hollow lower end of the ladder section thereabove or into the depending portion **80**. The upper end portion **132** of ladder section **24** is adapted to telescope into the lower end of the depending portion as shown in FIGS. **1** and **2** or into the lower end portion of one of the other ladder sections as shown in FIG. **3**; this is dependent on whether a single ladder section is used or more than one ladder section is used. The upper end portion **134** of ladder section **34** is adapted to telescope into the lower end of ladder section **36**; and the upper end portion **136** of ladder section **36** is adapted to telescope into the lower end of the depending portion of the platform means.

A single ladder section **24** can be used as shown in FIG. **1** so that the upper surface of the platform means is supported about six feet six inches above the ground. Ladder sections **24** and **36** can be used together so that the upper surface of the platform means is supported about eleven feet three inches above the ground. When all three ladder sections are used as shown in FIG. **3**, the upper surface of the platform means is supported about 16 feet above the ground.

As seen in FIGS. **8** and **9** steps **140** are formed of solid rods of aluminum having a circular cross-sectional configuration and having a threaded outer surface **142** formed on the outer end thereof. All of the ladder sections are provided with suitable holes for mounting the steps in position. A series of holes are provided including an enlarged hole **144** formed in one side of each ladder section and an opposite smaller threaded hole **146** formed on the opposite side of the ladder section so that a step can be inserted through the larger hole and threaded into the smaller hole opposite thereto to mount the step. Each pair of holes **124** and **126** also include an enlarged hole formed in one side of the depending portion and a smaller threaded hole formed in the opposite side of the depending portion for receiving a T-bolt.

A large hole and a small hole are disposed adjacent one another on each side of the ladder section as seen most clearly in FIGS. **1** and **12** so that a step can be mounted either on one side or the other side of the ladder section at any location, and further so that a double step extending on both sides of the ladder may be mounted at substantially the same height on the ladder section. A double step arrangement is shown in phantom line in FIGS. **8** and **9** and the double step arrangement in the assembled stand is clearly shown in FIG. **3** of the drawing wherein the double steps have been given the reference numerals 140', 140" and 140 "'.

It should be understood that each of the three ladder sections is provided with suitable holes **144** and **146** in the opposite sides thereof along the length thereof to support steps in desired positions which generally alternate at opposite sides of the ladder sections except where double steps are provided. Additionally, the reduced tubular ends of the ladder sections are also provided with similar hoes in the opposite sides thereof to mount steps at the joint between ladder sections. The lower open end portions of ladder sections **34** and **36** are provided with similar openings aligned with the openings of the portions which telescope into these lower open end portions so that T-bolts may be inserted to interconnect the joints, or so that steps can be inserted which will also interconnect the joints dependent on the location of the telescoping interconnection on the stand. All of the T-bolts in the invention are mounted by passing them through an enlarged hole on side of the associated member and threading them into a smaller threaded hole on the opposite side of the associated member.

As seen in FIG. **1**, an auxiliary step **150** is provided which can be used by a person to climb onto the platform means. This auxiliary step is supported by the ladder section immediately below the depending portion of the platform means at a distance which is convenient for an average sized person to move directly from the auxiliary step to the upper surface of the platform means. As seen in FIG. **12**, ladder section **24** is provided with a hole **152** in one side thereof, a similar hole being provided in the opposite side thereof, these holes being disposed such that when the stand is in operative position, the step will be disposed substantially horizontally to support the feet of a person climbing the stand.

The auxiliary step includes a tubular aluminum member **156** having a flat aluminum bar **158** welded to the outer end thereof. A person steps on this bar when using the auxiliary step. Member **156** has a pair of diametrically opposite holes formed therethrough which are adapted to be aligned with suitable holes formed in opposite sides of ladder section **24**. An enlarged hole **160** is seen in FIG. **12**, a smaller threaded hole being formed in the opposite side of the ladder section. As seen in FIG. **1**, a T-bolt **162** passes through hole **160** and the aligned holes in member **156** and is threaded into the smaller threaded hole to support eh auxiliary step in operative position. It should be understood that ladder sections **34** and **36** are also provided with holes similar to **152** to support the auxiliary step in operative position thereon when two or three ladder sections are employed.

As seen in FIG. **12**, the upper end **132** of ladder section **24** has a pair of holes **164** and **166** formed on opposite sides thereof for receiving steps mounted at the joint with other ladder sections. A pair of further holes **170** are formed through opposite sides of the upper end for

receiving a T-bolt **172** as shown in FIG. **1** to secure the upper end to the depending portion **80**, such T-bolt being disposed in holes **124** of the depending portion. When only the ladder section **24** is used as shown in FIGS. **1** and **2**, this arrangement is satisfactory.

However, when two or more ladder sections are employed it is necessary to employ a movable connection as illustrated in FIGS. **5–7** which permits the ladder sections to move independently of the tree and platform means secured thereto. The upper end portion **136** of ladder section **36** is provided with a pair of aligned holes **174** disposed through opposite sides thereof. End portion **136** also has a pair of aligned elongated longitudinally extending slots **176** formed through opposite sides thereof for slidably receiving a T-bolt therethrough to provide a lost-motion interconnection so that ladder section **36** will be able to move within certain limits with respect to the depending portion **80** of the platform means.

As seen in FIG. **5**, upper portion **136** has a tapered side edge **180** so that the upper end portion becomes smaller toward the upper extremity thereof to permit the upper end to telescope within the open lower end of the depending portion of the platform means and also to be slightly misaligned relative to the depending portion. This taper may be on the order of about 3/16 inch over a longitudinal distance of about five inches.

When assembling the stand with more than one ladder section, ladder section **36** is telescopically inserted within the open lower end of depending portion **80** of the platform means, and a T-bolt **184** is inserted through hole **124** at one side of the depending portion, thence through holes **174** in ladder section **36** and then threaded into the threaded hole **124** at the opposite side of the depending portion. This arrangement serves to connect ladder section **36** to depending portion **80** with a space of about ⅜ inch between the lower edge **186** of depending portion **80** and the shoulder **188** on the ladder section between the main body of the ladder section and the upper portion **136** thereof as seen in FIG. **6**. In this position, ladder section **36** is longitudinally aligned with the depending portion **80**.

The platform means is then set up against a tree and the base of the lowermost ladder section **24** is moved to level the platform so that the upper surface thereof is substantially horizontal. The prongs **130** of ladder section **24** are embedded in the ground to secure the base of the ladder to the ground. A person then ascends the steps at opposite sides of the ladder until he reaches a suitable double step and then secures the platform means to the tree by means of the chain.

T-bolt **184** is then removed and inserted through hole **126** at one side of the depending portion, thence through the mid portion of the slot **176** and then threaded into the threaded hole **126** at the opposite side of the depending portion. The stabilizer means is then used by turning handle **94** in a direction to push the platform means away from the tree, taking the spring out of the ladder and taking the load off of the joint between the platform means and ladder section **36**. The tapered edge **180** then permits the ladder section **36** to be slightly misaligned relative to the depending portion **80** under the influence of gravity to form the angle B in the position shown in FIG. **7**.

The use of the peepholes **120** and **122** will now be described. When the components are properly disposed in the position shown in FIG. **6**, daylight will be visible through peep holes **120**, while no daylight will be visible through peep holes **122**. When the components are properly disposed in the position shown in FIG. **7**, less daylight will be visible through peep holes **120**, and daylight will be visible through peep holes **122**. Accordingly, peep holes **120** and **122** serve as a means for checking that the components are in the proper operative positions.

It is apparent that since T-bolt **184** passes through the center of slot **176** in the position shown in FIG. **7**, the T-bolt serves as a retaining member securing the ladder to the platform means, but permitting relative movement of the tree and platform means relative to the ladder so that movements of the tree by wind will not damage the structure of the stand.

Referring now to FIG. **12** of the drawing, the carrying mode of the invention is illustrated wherein the various components of the device are interconnected with one another. It will be noted that the platform means is upside down and that a number of threaded holes **190** are provided in one side of the depending portion within which all of the steps can be threaded and carried during transport.

The number of ladder sections carried will depend on the height at which a person wishes to be supported. Ladder section **24** is illustrated as being carried by the platform means. Suitable holes are provided through opposite sides of the ladder section to receive T-bolts **192** and **194** which pass through the holes in the ladder section and are threaded into suitable threaded holes provided in the undersurface of platform members **42** and **40** respectively. Ladder sections **34** and **36** are indicated in phantom lines, and may be carried in a similar manner on the platform means by a pair of T-bolts passing through holes in the ladder sections and being threaded into suitable holes (not shown) in the undersurface of platform members **42** and **40**.

In the carrying mode, post **60** of the seat means extends through aligned holes **200** formed in opposite sides of the depending portion **80** as seen in FIG. **5**. A pair of holes **202** are formed through the other opposite sides of the depending portion. A T-bolt **204** as seen in FIG. **12** extends through an enlarged hole **202** at one side of the depending portion and thence through one of the holes **62** formed through post **60** and is threaded into a smaller threaded hole **202** at the opposite side of the depending portion to hold the seat means in position. The chain is carried in the hollow interior of the post, and the tubular portion **156** of the auxiliary step is dimensioned to telescope within the open end of the post. Accordingly, the auxiliary step is carried by the post, and T-bolt **204** also passes through the holes formed in tubular portion **156** to retain the auxiliary step in the carrying position shown.

It is apparent that after arriving at a suitable location, the components shown in FIG. **12** can be readily manually disassembled and connected to provide an erected nature stand without the use of any tools.

The invention has been described with reference to a preferred embodiment. Obviously, various modifications, alterations and other embodiments will occur to others upon reading and understanding this specification. It is our intention to include all such modifications, alterations and alternate embodiments insofar as they come within the scope of the appended claims or the equivalent thereof.

What is claimed is:

1. A portable nature stand comprising platform means for supporting a person, said platform means including

an upper surface, and a lower portion, securing means for engaging a tree and securing the platform means to a tree, said platform means including a depending portion extending downwardly from said lower portion, said depending portion having a lower end, a ladder section having steps thereon and including an upper end and a lower end, the lower end of said depending portion and the upper end of said ladder section being connected to one another by a lost-motion interconnection so that said ladder section can move within certain limits relative to said depending portion to permit movement of a tree and the platform means relative to said ladder section.

2. A stand as defined in claim 1 including seat means mounted on said platform means for supporting a person on the stand, said seat means including means for mounting said seat means at various vertical heights relative to said upper surface of the platform means.

3. A stand as defined in claim 1 wherein said securing means comprises a flexible chain, means for tightening said chain about a tree, and an elongated relatively rigid member secured to said chain to facilitate passing the chain around a tree.

4. A stand as defined in claim 1 wherein said securing means includes a plurality of spikes extending from said tree engaging edge portion of the platform means and adapted to be embedded in a tree when the stand is in operative position, said spikes having sharpened chisel-like tips thereon.

5. A stand as defined in claim 4 wherein said spikes include a first pair of spikes and a second pair of spikes disposed on opposite sides of said first pair of spikes, said second pair of spikes being longer than said first pair of spikes.

6. A stand as defined in claim 1 including an auxiliary step supported by said ladder section and extending in a direction generally perpendicular to the direction of said first-mentioned steps.

7. A portable nature stand comprising platform means for supporting a person, said platform means including an upper surface, a lower portion and a tree-engaging edge portion, securing means for engaging a tree and securing the platform means to a tree, said platform means including a depending portion extending downwardly from said lower portion adjacent said tree engaging edge portion of the platform means and at an acute angle to said upper surface, said depending portion having a lower end, and a ladder section having steps thereon, said ladder section being detachably connected to and generally aligned with said depending portion, said stand including stabilizer means engageable with a tree and being adjustably supported by said depending portion.

8. A stand as defined in claim 7 wherein said lower end of the depending portion is hollow, said ladder section having an upper end telescopically received within said hollow lower end.

9. A stand as defined in claim 8 including a movable interconnection between said lower end of the depending portion and said upper end of the ladder section.

10. A stand as defined in claim 9 wherein said movable interconnection includes a retaining member extending through an elongated slot formed in said upper end of the ladder section.

11. A stand as defined in claim 10 wherein said upper end of the ladder section includes a tapered side surface which permits said ladder section to be slightly misaligned relative to said depending portion.

12. A stand as defined in claim 11 including peep holes formed through said depending portion to determine that said movable interconnection is in proper position.

13. A stand as defined in claim 7 including a plurality of ladder sections each of which has steps thereon and being detachably connected to one another, the uppermost ladder section being detachably connected to said depending portion by a movable interconnection to permit movement of a tree and the platform relative to said uppermost ladder section.

14. A stand as defined in claim 13 wherein the lowermost ladder section has a base portion including stabilizing prong means thereon adapted to be embedded in the ground to stabilize the ladder sections from twisting when a person climbs the ladder sections to secure the stand to a tree.

15. A portable nature stand comprising platform means for supporting a person, said platform means including an upper surface, a lower portion and a tree-engaging edge portion, securing means for engaging a tree and securing the platform means to a tree, said platform means including a depending portion extending downwardly from said lower portion adjacent said tree engaging edge portion of the platform means and at an acute angle to said upper surface, said depending portion having a lower end, and a ladder section having steps thereon, said ladder section being detachably connected to and generally aligned with said depending portion, said stand including seat means mounted on said platform, said seat means including a supporting post having a rotatable seat at the upper end thereof, said depending portion having a hole formed therethrough to receive said post when a person is carrying the stand.

16. A portable nature stand comprising platform means for supporting a person, seat means mounted on said platform means for supporting a person on the stand, said platform means including an upper surface, a lower portion and a tree-engaging edge portion, securing means for engaging a tree and securing the platform means to a tree, said platform means including a depending portion extending downwardly from said lower portion at an acute angle to said upper surface, stabilizer means engageable with a tree and being adjustably supported by said depending portion, said depending portion having a lower end, a ladder section having steps thereon and including an upper end and a lower end, said lower end of the depending portion and said upper end having a movable interconnection therebetween to permit movement of tree and the platform relative to said ladder section.

17. A stand as defined in claim 15 wherein said lower end of the depending portion is hollow and has a longitudinal dimension, said upper end of the ladder section being telescopically received within said lower end of the depending portion, said lower end of the depending portion having a hole formed therethrough, said upper end of the ladder section having a slot formed therethrough, a retaining member extending through said hole in said lower end of the depending portion and through said slot in said upper end of the ladder section, a further ladder section having steps thereon being detachably connected to said lower end of the first-mentioned ladder section.

18. A stand as defined in claim 17 wherein said lower end of the depending portion includes a further hole formed therethrough and spaced longitudinally from

said first mentioned hole, said upper end of the first-mentioned ladder section having another hole formed therethrough and spaced from said slot, said further hole and said another hole being adapted to be aligned to receive a retaining member therethrough when securing the stand to a tree.

19. A stand as defined in claim **17** wherein said upper end of the first-mentioned ladder portion has a side edge which is tapered so that said upper end of the first-mentioned ladder portion becomes smaller toward the end thereof to thereby permit said first-mentioned ladder portion to be slightly misaligned relative to said depending portion.

20. A stand as defined in claim **19** including first and second peep holes formed through said first-mentioned ladder section and spaced from one another to determine that said movable interconnection is in proper position.

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10. RELATED PROCEEDINGS APPENDIX

There are no related proceedings or decisions rendered by a court or the Board in any proceeding identified pursuant to paragraph 37 C.F. R. §41.39(c)(1)(ii).